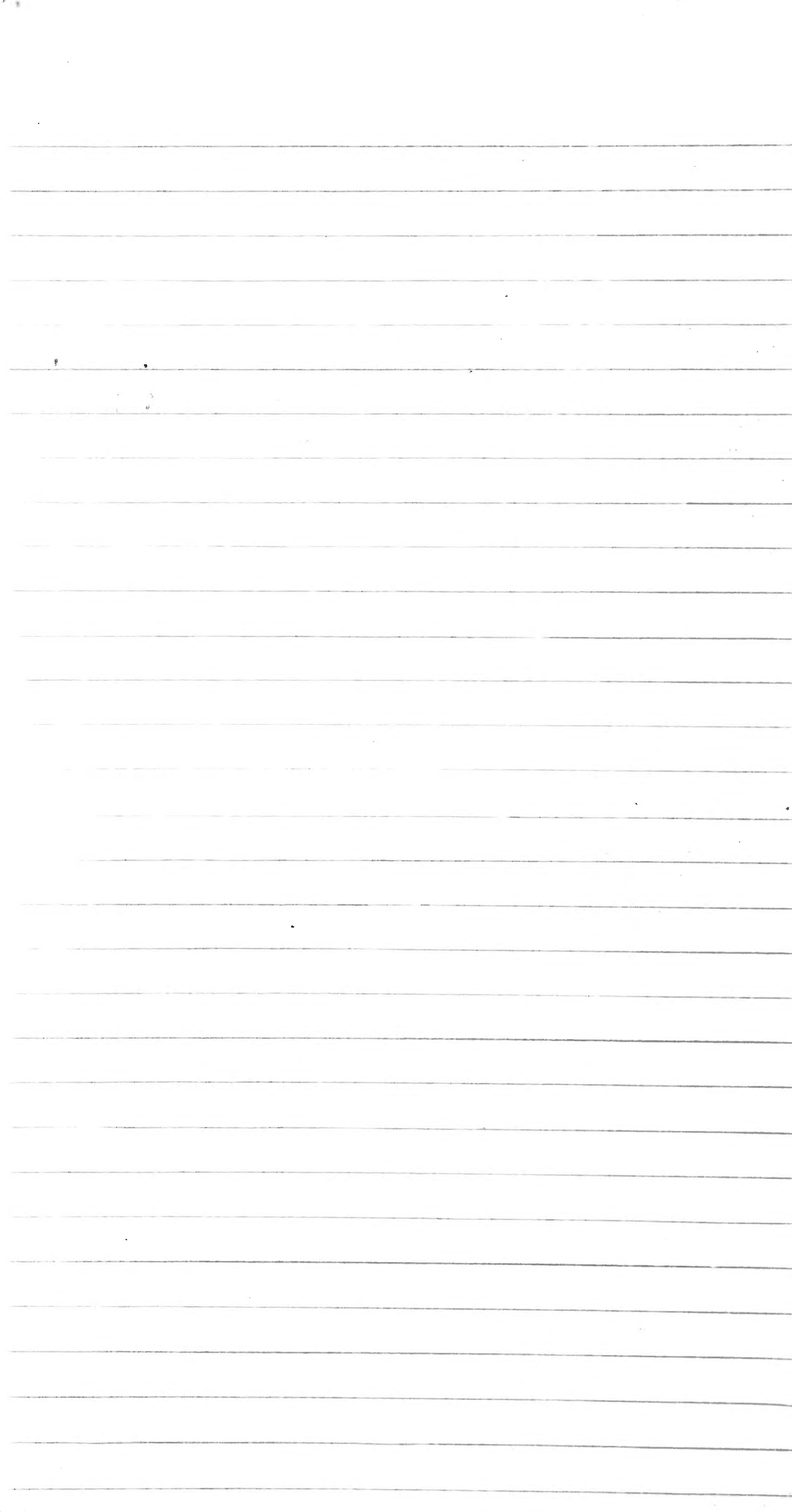


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Howell, T. R.

1946-1950

Catalogue

nos. 249-461

Field Catalogue of Thomas R. Howell

Jacob's Lake, Kaibab Forest, Coconino Co., Arizona

September 7, 1946

249 ♀? *Piranga ludoviciana*

Oxford Tract, Berkeley, Alameda Co., Calif.

Oct. 15, 1946

250 ♀ *Spinus tristis*

Grizzly Island, sea level, Solano Co., Calif.

October 22, 1946

251 ♂ *Erolia minutilla*

252 ♂ *Agelaius phoeniceus*

2 mi. S. Antioch, 150 ft., Contra Costa Co., Calif.

October 24, 1946

253 ♂ imm. *Lanius ludovicianus*

48 g.

254 ♀ imm. *Agelaius tricolor*

46.6 g.

Nortonville, 1300 ft., Contra Costa Co., Cal.

November 10, 1946

255 ♀ ad. *Vireo huttoni*

10 g.

256 ♂ ad. *Junco oreganus*

17.7 g.

November 29, 1946

257 ♂? imm. *Zonotrichia coronata*

27.7 g.

258 ♀ ad. *Parus inornatus*

16.0 g.

December 30, 1946

Vallecito, 1500 ft., San Diego Co., Calif.

259 ♂ *Auriparus flaviceps*

260 ♂ ad. *Phainopepla nitens*

261 ♂ *Calypte costae*

262 ♀? *Amphispiza bilineata*

263 ♂ *Amphispiza bilineata*

264 ♂? *Amphispiza nevadensis*

~~265 ♂ ad. *Sialia mexicana*~~

Vallecito, 1500 ft. San Diego Co., Calif.

December 31, 1946

265 ♂ ad. *Sialia mexicana*

266 ♂ ad. *Heleodytes brunneicapillus*

267 ♂ ad. *Salpinctes obsoletus*

268 ♂ ad. *Sayornis saya*

269 ♂ ad. *Auriparus flaviceps*

270 ♂ ad. *Phainopepla nitens*

January 1, 1947

271 ♀ ad. *Phainopepla nitens*

Blair Valley, 1800 ft., San Diego Co., Calif.

January 1, 1947

272 ♂ *Dryobates scalaris*

Sweetwater Lake, 300 ft., San Diego Co., Calif.

273 ♂ ad. *Spinus tristis*

274 ♂ ad. *Carpodacus mexicanus*

La Mesa, 400 ft., San Diego Co., Calif.

January 2, 1947
275 ♂ *Calypte anna*

276 ♂ *Chamaea fasciata*

Newport Beach, sea level, Orange Co., Calif.

January 3, 1947

277 ♀ *Passerculus ^srostratus*

278 ♂ *Passerculus ^srostratus*

279 ♀ *Passerculus sandwichensis beldingi*.

20 mi. E. of Cambria, San Luis Obispo Co., Calif.

January 4, 1947

280 ♂ *Lophortyx californicus* 159.7 g.

14 mi. E. of Cambria, San Luis Obispo Co., Calif.

~~281~~ January 4, 1947

281 ♂ *Pica nuttalli* 164.5 g.

San Simeon, sealevel, San Luis Obispo Co., Calif.

January 4, 1947

282 ♂ *Carpodacus* ~~purpureus~~ ^{mexicanus} 23.1 g.

283 ♀ *Larus heermanni* 390.0 g.

Nortonville, 1300 ft, Contra Costa Co., Calif.

January 12, 1947

284 ♂? *Zonotrichia coronata* 28.7 g.

Tomales Point, sea level, Marin Co., Calif

February 14, 1947

285 ♂ ad. *Histrionicus histrionicus* 631 g.

286 ? *Cerorhinca monocerata* (skeleton only)

Sonora, 1800 ft, Tuolumne Co., Calif.

April 7, 1947 (collected by Joe T. Marshall Jr.)

287 ♀ *Asyndesmus lewis* 102.7 g.

Nortonville, 1300 ft. Contra Costa Co., Calif.

April 12, 1947

288 ♂ *Tachycineta thalassina* 14.4 g.

289 ♂ *Selasphorus rufus* 3.0 g.

290 ♂ *Stellula calliope* 2.4 g.

Berkeley, Alameda Co., Calif.

April 13, 1947

291 ♂ *Selasphorus alleni* 3.1 g.

Russell City, Alameda Co., Calif.

April 19, 1947

292 ♀ *Recurvirostra americana* 372.4 g.

293 ♂ *Colymbus nigricollis* 490.6 g. (!)

294 ♀ *Colymbus nigricollis* 276.4 g.

Tomales Point, Marin Co., Calif.

April 27, 1947

295 ♂ *Haematopus bachmani* 544.1 g.

Tomales Point, sea level, Marin Co., Calif.

April 27, 1947

296 ♀ *Arenaria melanocephala* 120.8g.

Strawberry Canyon, Berkeley, Alameda Co., Calif.

May 4, 1947

297 ♂ *Phalaenophilus nuttalli* 49.5g. ^{testis 6.5mm.}

298 ♂ *Phalaenophilus nuttalli* 50.5g. ^{testis 4mm.}

6mi. S. of Soda Springs, 6000 ft., Placer Co., Calif., May 30, 1947

299 ♂ *Dendroica occidentalis* testes 8x5mm

300 ♂ *Carpodacus purpureus* testes 8x6mm.

301 ♂ *Carpodacus purpureus* testes 7x5mm.

5mi. S.E. of Truckee, 7000 ft., Placer Co., Calif.

May 31, 1947

302 ♂ *Sialia currucoides* testes 11x6mm

303 ♀ ad *Sialia currucoides* brood patch

304 ♂ *Spizella breweri* testes 10x6mm.

305 ♂ *Dendroica auduboni* testes 8x5mm

306 ♂ *Myadestes townsendi* testes 11x6mm.

1½ mi. N.W. of Cisco, 6000 ft., Nevada Co., Calif.

June 1, 1947

307 ♂ *Xenopus albolaryatus* ^{brood patch} testes 6x3mm

1 mi. N.W. of Truckee, 6000 ft., Nevada Co., Calif.

May 31, 1947

308 ♀ *Sphyrapicus thyroideus* (alcoholic specimen)

3 Kilometers west of Axtla River, on road

to Xilitla, San Luis Potosí, Mexico Aug. 22, 1947

309 ♂ *Trogon violaceus*

August 24, 1947

310 ♂ ad. *Ciccoba nigrolineata*

311 ♂ *Crypturellus cinnamomeus*

312 ♀ *Habia ~~gottardi~~* sp.

313 ♂ *Henicorhina*

314 ♂ *Crypturellus cinnamomeus*

Mexico: San Luis Potosí; about 6 km. W. of Axtla River, on road to Xilitla

August 25, 1947

315 ♂ ~~*Euphonia*~~ *Tanagra laeta*

316 ♂ *Cyanerpes cyaneus*

317 ? *Momotus momota*

2 km. W. of Axtla River, on road to Xilitla

318 ♀ *Glaucidium brasilianum*

1 km. W. of Axtla River, on road to Xilitla

319 ♂ *Thamnophilus doliatus*

Mexico: San Luis Potosí: Xilitla

August 29, 1947

320 ♂ *Tanagra affinis*

Mexico: San Luis Potosí; Xilitla Region;
Cerro Miramar 4100 ft.

September 1, 1947

321 ♂ *Atlapetes ~~torquatus~~ albinucha*

322 ♂ *Mitrephanes phaeocercus*

323 ♀ ad. *Vireolanius melitophrys*

September 2, 1947

324 ♂ *Streptoprocne zonaris* 3800 ft.

325 ♂ *Xiphorhynchus erythropygius* 4200 ft

326 ♂ *Dendrortyx*

327 ♀ *Buteo jamaicensis*

4100 ft.

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Howell, T. R.
1947-8

Howell, T. R.
~~1947~~

1½ mi. SW. of Orinda, Contra Costa Co., Calif.

October ~~1~~³, 1947

328 ♂♀ *Perognathus californicus* 197-111-26-12-8 23.7g.

329 ♀ *Peromyscus maniculatus* 155-72-19-15-11 23.6g.

Berkeley, Alameda Co., Calif.

Jan. 31, 1948

330 ?♀ *Chamaea fasciata* 12.2g.

Big Creek, 1 mi NE Swanton, Santa Cruz Co., Calif.

May 2, 1948

testis 14 x 8 mm.

331 ♂ ad *Pheucticus melanocephalus* 39.5g.

8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc

Co., Calif. May 20, 1948

332 *Sphyrapicus varius daggetti* (formalin) 47.0g.

333 ♀ ad *Dendroica auduboni* brood patch 14.0g.

334 ♂ ad *Passerella iliaca* testes 10 x 6 mm. 28.5g.

335 ♀ ad *Vireo solitarius* ovary 5 x 3 mm. 13.9g.

336 ♂ ad *Dendroica auduboni* testis 9 x 5 mm. 11.7g.

337 ♂ ad *Spizella breweri* testis 9 x 5 mm. 11.3g.

May 21, 1948

338 ♂ ad *Psaltriparus minimus* testis 4 x 2 mm. 4.7g.

339 ♀ ad *Cyanocitta stelleri* ovary 10 x 8 mm. 108.2g.

340 ♂ ad *Sitta carolinensis* testis 6 x 3 mm. 16.7g.

341 ♂ ad *Dendroica townsendi* testis 5 x 3 mm. 10.0g.

342 ♂ ad *Sitta pygmaea* testis 6 x 3 mm. 9.8g.

343 ♂ ad *Passerella iliaca* testes 13 x 8 mm. 29.8g.

344 ♀ ad ~~*Dendroica*~~ *Dendrocopos* ~~*albolarvatus*~~ ovary 9 x 8 mm. 61.1g.

May 22, 1948

345 ♂ ad *Vireo gilvus* testis 5 x 3 mm.; fat. 11.9g.

346 *Empidonax* 11.0g.

Howell, T. R.
1948

8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.

May 22, 1948

347 ♀ *Sylvilagus n. nuttallii* 334-27-97-ⁿ62 803.0 g.

May 23, 1948

348 ♀ ad. *Cyanocitta stelleri* ovary 7x5 mm. 91.7 g.

349 ♂ ad. *Passerella iliaca* testis 10x6 mm. 28.2 g.

350 ♂ ad. *Carpodacus purpureus* testis 7x6 mm. 20.2 g.

351 ♀ ad. *Sphyrapicus varius daggetti* > *nuchalis* largest follicle 2 mm. ovary 9x9 mm. 49.4 g.

May ²⁴~~23~~, 1948

352 ♂ *Sphyrapicus varius daggetti* testis 8x5 mm. 47.7 g.

North shore of Donner Lake, 5931 ft., 4 mi. W. of
Truckee, Nevada Co., Calif.

August 27, 1948. (coll. by H. L. Cogswell)

353 ♂ *Aegolius a. acadicus* (skel. only) 80.9 g.

Twin Springs, ft., 3/4 mi. E of Crowder Flat,
38 mi. NNW of Alturas, Modoc Co., Calif.

May 22, 1949

354 *Thamnophis* (formalin)

Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
Modoc Co., Calif. May 22, 1949

355 ♂ *Loxia curvirostra* testis 3x2 mm. 34.8 g

356 ♀ " " ovary 7x3 mm. 34.2 g.

~~357 ♀~~ May 24, 1949

357 ♀ *Loxia curvirostra* ovary 5x5 mm. 29.2 g.

Blue Mountain Road, ft., 32 mi. NNW of
Alturas, Modoc Co., Calif.

May 26, 1949

358 *Pituophis catenifer* (formalin)

359 *Aphelocoma coerulescens*

(next page)

Howell, T.R.
1949

Crowder Flat Road, 5200 ft., 30 mi. NNW of Alturas,
Modoc Co., Calif.

May 28, 1949

360 *Coluber constrictor* (formalin)
Crowder Flat, 5200 ft., 30 mi. NNW of Alturas, Modoc Co., Calif.
June 3, 1949

361 ♂ *Sitta carolinensis* testis 5x4 mm. 16.1 g.

June 7, 1949

362 ♀ *Vireo gilvus* ovary with egg. 12.1 g.

363 ♂ *Sitta pygmaea* testis 6x4 mm. 9.1 g.

364 juv. *Charina bottae* (alive)

June 8, 1949

365 ♂ *Empidonax* testis 5x4 mm. 10.0 g.

June 10, 1949

366 ♂ imm. *Cyanocitta stelleri* testes 2x1 mm. (!) 105.5 g.

367 ♂ " " testis 9x4 mm. 106.5 g.

Willow Creek Ranch, 4985 ft, 34 mi. NNW of Alturas,
Modoc Co., Calif.

June 12, 1949

368 ♂ *Steganopus tricolor* testis 7x4 mm. brood patch 47.0 g.

369 ♀ " " slightly fat.
ovary 12x10 mm. 58.2 g.

17 mi. NNW of Alturas ft., Modoc Co., Calif.

June 15, 1949

370 ♀ ad. *Aphelocoma coerulescens* brood patch
ovary 11x8 mm. 91.7 g.

30 mi. NNW of Alturas, ft., Modoc Co., Calif.

June 15, 1949

371 ♀ imm. ~~*Cyanocephalus*~~ ^{*Gymnorhinus*} *cyanocephalus* ovary 5x3 mm. 92.0 g.

372 ? imm. " " — 97.7 g.

373 ♂ imm. " " testis 3x2 mm. 108.9 g.

(next page)

Howell, T.R.
1949

Dry Valley Reservoir, 4975 ft., 33 mi. NNW of Alturas,
Modoc Co., Calif.

June 16, 1949

374 ~~255~~ ♂ ad. *Catoptrophorus semipalmatus* testis 9x3mm. 262.9g.
375 ♀ ad. " " ovary 13x10mm 306.4g.

Crowder Flat, 5200ft, 38 mi. NNW of Alturas, Modoc Co., Calif.

June 17, 1949

376 ♀ ad. *Chordeiles minor* ovary 15x10mm. 76.5g.
377 ♀ ad " " slightly fat sitting on 2 eggs ovary 13x9mm 77.8g.

June 20, 1949

378 ♂ ad. *Carpodacus cassinii* testis 9x7mm. 29.1g.

June 21, 1949

379 ♂ ad. *Certhia familiaris* brood patch
testis 7x5mm. 6.2g.

June 29, 1949

1 { 380 ♀ ad. *Sphyrapicus varius* n.d. no fat brood patch
ovary 4x3mm. 47.8g.
381 ♀ juv. " " no fat, no visible follicles
ovary 5x3mm. 40.0g.
382 ♀ juv. " " slightly fat, no follicles
visible, ovary 4x2mm 41.0g.
?1 { 383 ♀ juv. " " no fat, no follicles visible
ovary 4x3mm. 35.5g.
8 { 384 ♀ ad. " " brood patch; no fat;
follicles < 1mm. 45.5g.
385 ♂ ad. " " ovary 7x4mm.
brood patch; no fat;
testis 3x2mm. 43.3g.

July 2, 1949

7 { 386 ♂ juv. *Sphyrapicus varius* no fat.
testis 1mm. 34.4g.
387 ♂ juv. " " no fat
testis 1mm 38.4g.
388 ♂ juv. " " no fat
testis 1mm. 36.5g.
389 ♂ juv. " " no fat
testis 1mm. 33.0g.
390 ♂ juv. " " no fat;
testis 1mm. 37.3g.
391 ♀ ad. " " brood patch no fat
ovary 5x5mm 48.5g.
392 ♀ ad. " " largest follicle 1mm.
brood patch no fat
ovary 5x4mm. 40.0g.
393 ♂ ad. " " nuchalis
daggetti brood patch
testis 4x2mm 45.2g.
no fat

July 3, 1949

3 { 394 ♂ ad. *Sphyrapicus varius* brood patch; no fat;
testis 2.5x2mm 48.0g.

Howell, T.R.
1949

Crowder Flat, 5200ft., 38mi. NNW of Alturas, Modoc Co., Calif. July 3, 1949				
3	395 ♀ ad.	Sphyrapicus varius daggetti		largest follicle < 1mm. no fat brood patch; ovary 5x3mm 45.5g
2	396 ♀ ad.	"	"	brood patch; largest follicle < 1mm; no fat; ovary 8x5mm. 46.0g.
	397 ♂ ad.	"	"	brood patch; no fat; testis 4x2.5mm. 43.0g.
	398 juv.	"	"	(formalin) 39.7g
	399 "	"	"	" 37.1g.
	400 "	"	"	" 41.5g.
6	401 "	"	"	" 41.6g.
	402 ♀ ad.	"	"	brood patch; slightly fat; ovary 7x6mm. 46.2g.
	403 ♂ ad.	"	"	largest follicle 1mm. brood patch testis 46.4g.

See next page.

Howell, T.R.
1950

3 mi. S. of Calipatria, - 180 ft., Imperial Co., Calif.

January 26

♀ ad. *Mimus polyglottis*

ovary 8x4mm.

January 27

♂ ad. *Pipilo aberti*

testis 4x2mm.

♂ ad. " "

testis 4x2mm.

Salton Sea, -245 ft., 10mi. NW of Calipatria, Imperial Co., Calif.

January 28

♂ ad. *Passerculus sandwichensis*

testis 2x1mm.

Dry Lake, 15mi. N. of Princeton, British Columbia

May 2

400a ♂ *Anthus spinoletta*

Temp: 40.2°C moderately fat
16.0g. Airt.: 5°C. testis 3x2mm.

May 3

401a ♀ *Junco oreganus*

14.4g. ovary 7x5mm.

402a ♂ *Ixoreus naevius*

76.7g. testis 7x3mm.

403a ♂ *Junco oreganus*

19.4g. testis 3x2mm.

May 4

404 ♂ *Parus atricapillus*

8.9g. testis 6x5mm.

405 ♀ *Regulus calendula*

6.7g. ovary 3x2mm.

406 ♂ *Poocetes gramineus*

25.4g testis 7x5mm.

May 5

407 ♂ *Regulus calendula*

6.4g. testis 4x3mm.

408 ♂ *Melospiza melodia*

23.7g. testis 7x5mm.

409 ♂ *Passerella iliaca*

31.8g. testis 6x4mm.

May 6

410 ♀ *Gavia immer*

11 lbs. (spring scale)
largest follicle 8mm.

May 8

411 ♂ *Sphyrapicus varius nuchalis*

46.1g. testis 5x4mm.

412 ♀ " " "

42.7g.

McLeese Lake, 20mi. N. of Williams Lake, B.C. June 11

413 *Thamnophis sirtalis*

am 31. 10.

31

Howell, T.R.
1950

17.5 mi. S. of Quesnel, ft. British Columbia

June 13

414 ♂ *Sphyrapicus varius nuchalis*

Temp. 41.8°C

testis 7x5 mm. 52.5g.

Temp. 42.0°C.

415 ♀ " " "

ovary 8x6 mm. 47.7g.

Alexandria, 1800ft, 28 mi. S. of Quesnel, B.C.

June 14

416 *Empidonax*

13.0g. Brood Patch

417 ♂ *Dendroica magnolia*

testis 6x4 mm. 39.4°C

418 ♂ *Picoides arcticus*.

brood patch
testis 5x2 mm. 55.7g. 42.0°C

June 15

419 ♂ *Carpodacus* ^{purpureus} ~~cassini~~

26.8g. testis 8x10 mm. 41.0°C

Brood patch

420 ♂ *Sphyrapicus varius nuchalis*

52.1g. testis 5x3 mm. 42.0°C.

Brood patch

421 ♀ " " "

46.3g. ovary 7x5 mm. 42.2°C

June 16

422 ~~Hyla~~ *Rana*

423 ♂ *Hylocichla ustulata*

Testis 11x6 mm. 28.2g. 38.5°C

424 ♂ *Hylocichla guttata*

Testis 11x6 mm. 27.0g. 41.0°C

June 21

425 ♂ *Hylocichla guttata*

Testis 11x7 mm. 27.8g. 40.8°C.

426 ♂ *Vireo olivaceus*

Testis 8x6 mm. 15.3g. 39.0°C
Moderately Fat

427 ♂ *Loxia curvirostra*

Testis 5x4 mm. 29.7g. 41.0°C

June 22

428 *Petrochelidon pyrrhonota*

fat. testis 10x5 mm. 27.8g.

~~429 " "~~

Nukko Lake, ft., mi. ^{NW} ~~SE~~ of Prince George, B.C.

June 24

429 ♂ *Sphyrapicus varius ruber*

Brood Patch

54.7g. Testis 3x2 mm. 41.6°C

430 ♀ " " "

Brood patch

51.6g. Ovary 6x5 mm. 41.6°C

16 mi. N. of Summit Lake,

ft., British Columbia

June 25

431 *Thamnophis sirtalis*

Howell, T.R.
1950

catalog

Summit Lake, ft., British Columbia

June 26

432 ♀ Bufo

433 ~~Hyla~~ Rana

37 mi. N. of Summit Lake, ft., British Columbia

June 27

434 ♀ Seiurus novaeboracensis

435 ♂ " "

33.6 mi. N. of Summit Lake,

436 Melospiza lincolnii

437 Rana

16 mi. S. of Quesnel, ft., B.C. June 28

438 ♂ Melospiza lincolnii

439 ♀ Hylocichla ustulata

440 ♀ Parus atricapillus

14.7 mi. S. of Quesnel, ft., B.C.

June 30

441 ♂ Sphyrapicus varius nuchalis

442 ♀ " " "

10.0 mi. S. of Quesnel, ft., B.C.

July 1

443 ♀ Sphyrapicus varius ruber

Alexandria, 1800 ft., 28 mi. S. of Quesnel, B.C.

July 4

444 ♂ juv. Sphyrapicus varius nuchalis x ruber Testis 1 mm. 47.4 g.

445 ♀ juv. " " " x " Ovary 3 mm. 44.5 g.

McLeese Lake, ft., 20 mi. N. of Williams Lake, B.C.

July 4

446 ♂ Sphyrapicus varius ruber (> nuchalis?) Temp. 42.4°C Brood patch 47.0 g. Testis 3 x 2 mm.

Alexandria, 1800 ft., 28 mi. S. of Quesnel, B.C. July 5 3 x 2 mm.

447 ♂ Sphyrapicus varius ruber Brood patch; 51.2 g.

Howell, T.R.
1950

Catalog

Alexandria, 1800 ft., 28 mi. S. of Quesnel, British Columbia

July 5

448 ♂ *Sphyrapicus varius nuchalis* Brood patch Testis 3x2 mm. 46.4g.
16 mi. S. of Quesnel, ft., B.C.

July 7

449 ♀ *Sphyrapicus varius nuchalis* > *ruber* Brood patch 54.7g.
41.2°C Ovary 5x4mm.
McLeese Lake, ft., 20 mi. N. of Williams Lake, B.C.

July 7

450 ♀ ad. *Sphyrapicus varius nuchalis* mated to #446 Brood patch 44.7g.
41.5°C Ovary 5x5mm.
451 ♂ juv. " " " x *ruber* (> *nuchalis*?) Testis 1mm.
452 ♀ " " " " x " (") 47.5g.
40.4°C Ovary
453 ♀ " " " " x " (") 41.4g. 5x2mm.
40.0°C Ovary
454 ♂ " " " " x " (") 43.7g. 5x2mm.
40.0°C Testis
43.0g. 1mm.

16 mi. S. of Quesnel, ft., B.C.

July 8

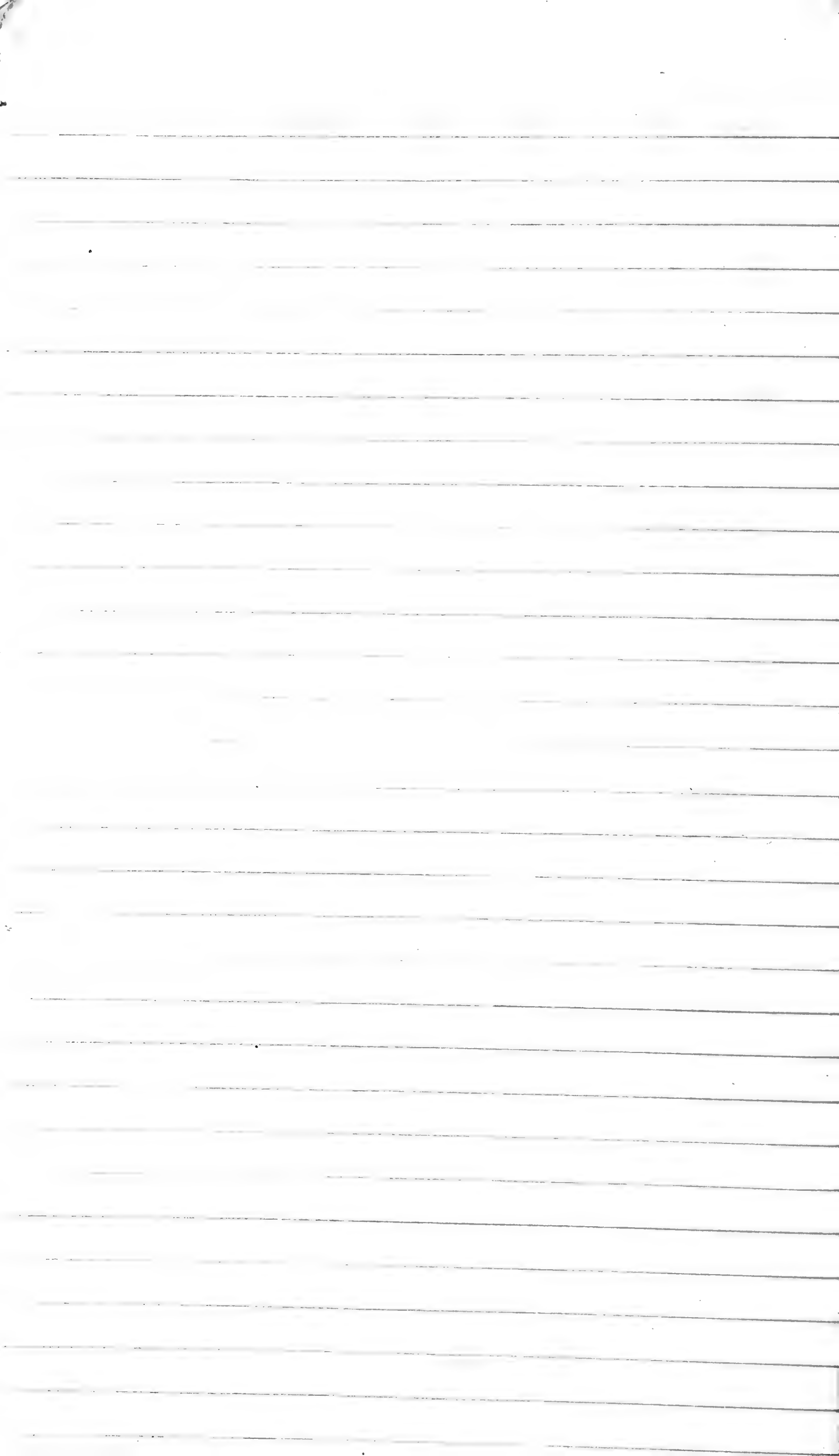
455 ♀ *Perisoreus canadensis* 42.4°C
Ovary 6x2mm. 62.3g.
456 ♂ *Sphyrapicus varius nuchalis* > *ruber* mate of 449 Brood patch 40.5°C
Testis 3x2mm. 53.5g.
457 ♂ " " *ruber* Brood patch
Testis 3x2mm. 51.3g.
458 ♀ " " " Brood patch
Ovary 5x5mm. 49.0g.
459 ♀ " " *nuchalis* Brood patch 46.6°C
Ovary 6x4mm. 47.0g.

1951

Junction of U.S. Highways 260 and 63, Petrified
Forest National Monument, Navajo Co., Arizona

February 5

460 ? ad. *Calcarius lapponicus* 22.3g.
461 ♀ ad. *Eremophila alpestris* 32.0g.



Howell, T. R.

1946-1950

Journal

Howell, T.R.

1946

Nov. 3; East end of Alameda Id., Alameda Co., Cal.

Weather: Clear, sunny, cold, very windy.

Associations and Birds:

Mud flats and sandy shore of San Francisco Bay:

Eared Grebe

Brown Pelican

Black-bellied Plover

sanderling

Western Gull

Dowitcher

Bonaparte Gull

Glaucous-winged Gull

American Pipit

Killdeer

Whistling Swan

Willet

Marsh Hawk

Marbled Godwit

Red-backed Sandpiper

Western Meadowlark

Pintail

King-billed Gull

semipalmated Plover

Bay Farm Island, Alameda Co., Cal

Mud Flats at ~~East~~ West end of Island

Western Sandpiper

Least Sandpiper

Red-backed Sandpiper

Avocet

Killdeer

Dowitcher

Howell, T.R.
1946

Nov. 3; Bay Farm Island, Alameda Co., Cal

Black Turnstone

American Egret

Western Gull

Ring-billed Gull

California Gull

Glaucous-winged Gull

Sandy field, overgrown with coarse grass

Burrowing Owl

Western Meadowlark

Bay and mud flats on northeast edge
of Island:

Coot

Pintail

Double-crested Cormorant

American Egret

Hudsonian Curlew

Greater Yellow-legs

Western Gull

California Gull

Ring-billed Gull

Herring Gull

Western Sandpiper

Least Sandpiper

Red-backed Sandpiper

Dowitcher

Willet

Avocet

Marbled Godwit

Glaucous-winged Gull

Howell, T.R.
1946

Nov. 3; Bay Farm Island, Alameda Co., Cal.

In shrubbery along edge of golf course

White-crowned Sparrow

House Sparrow

Marshy area between shore and road

California Clapper Rail

Savanna Sparrow

Howell, T.R.

1946

Nov. 24; Las Trampas Creek, near St. Mary's College, Contra Costa Co., Calif.

Weather: clear, sunny, cool.

Oak-wooded canyon

California Jay

Red-shafted Flicker

Nuttall Woodpecker

Audubon Warbler

Hutton Vireo

Bewick Wren

American Goldfinch

Arkansas Goldfinch

(Flying over)

{ Canvasback

{ Mallard

{ Ring-necked Duck (?)

Plain Titmouse

Hermit Thrush

Song Sparrow

Black Phoebe

Coot

Ruddy Duck

Ring-necked Duck

White-crowned Sparrow

Pied-billed grebe

Anna Hummingbird

Sparrow Hawk

Red-winged Blackbird

Shrike (L. ludovicianus)

Killdeer

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1946

Nov. 24; Las Trampas Creek, St. Mary's College

Contra Costa Co., Calif. (cont'd)

Buffle-head Duck

Sharp-shinned Hawk

Wilson snipe

Spotted Towhee

California Quail

Bush Tit

Wren-tit

Long-billed Marsh Wren

Oregon Junco

Western Bluebird

Lincoln Sparrow

Red-tailed Hawk

Steller Jay

Red-breasted Sapsucker

Ruby-crowned Kinglet

White-breasted Nuthatch

Varied Thrush

Golden-crowned Kinglet

Marsh Hawk

Brown Towhee

Robin

Cedar Waxwing

Winter Wren

White Pelican

Golden-crowned Sparrow

Howell, T.R.

1946

Journal

Nov. 24; Las Trampas Creek, St. Mary's College,
contra Costa Co., Calif

Arrived at locality about 9:00 A.M. The country is hilly, sparsely wooded with oaks; the unwooded portion is grassy savanna-type country. We walked eastward along a dirt road through the canyon, and past a reservoir where water birds were seen. There were about 25 coots, 8 ruddy ducks, 1 baldpate, 2 ring-necked ducks, and 5 pied-billed grebes. Most of the coots and the baldpate were feeding at the edge of a small mud-lump island. The Anna Hummingbird (only 1 seen so far) was poking around in a willow tree at the reservoir edge. One canvasback was noted sitting on the mud-lump, and a bufflehead, ♀ mallard and two more ring necks were seen at the far end of the reservoir. A single snipe was crouched on one of the mud-lumps. Red-wings sang occasionally from the cat-tails at the rim of the pond. Apparently a sharp-shin or some other hawk went after a flock of quail in the canyon, for they and the bush-tit sounded frantic alarm notes. Farther up the road were deep gullies with numerous oaks along the slopes. Here Flickers and Hutton Vireos were quite

Howell, T.R.
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Journal

Nov. 24; Las Trampas Creek, St. Mary's College,
Contra Costa Co., Calif. (cont'd.)

abundant. The vireos responded aggressively to imitation of their notes. At 10:45 a Red-tailed Hawk soared overhead.

In the bushes under the oaks whistles could be heard, and they gradually worked out into the open in response to imitations of their call note. As soon as the call imitation ceased they dropped back into the shrubbery.

In the thicker, shady deciduous woods Varied Thrushes were found feeding on berries of some sort. Other thrushes (hermit) and Bewick's Wrens also appeared in this type of habitat.

A gray adult marsh hawk soared over the hills at high altitude.

T

Howell, T.R.
1946

Journal

4 mi. S. Maxwell, Colusa Co., Calif.

Dec. 13. At 1:30 P.M. we stopped along the highway near rice fields and observed the following:

Tri-colored Redwing Loggerhead Shrike
Brewer Blackbird Western Meadowlark
Cowbird

Red-wing

Red-tailed Hawk (2)

White-crowned Sparrow

Savanna Sparrow

Sacramento National Wildlife Refuge
Glenn Co., Calif.

2:30 P.M. — rice fields and open, grassy fields; tule marshes and ponds

Yellow-headed Blackbird (1)

Tricolored Redwing

Redwing

American Bittern (2)

Great Blue Heron ~~(2)~~

American Egret

Coot

Marsh Hawk

Sparrow Hawk

Coot

House Sparrow

Savanna Sparrow

White-fronted Goose

Canada Goose

Lesser Snow Goose

White Pelican

Howell, T. R.

1946

Journal

Sacramento National Wildlife Refuge,
Glenn Co., Calif.

Dec. 14 (cont'd.)

Whistling Swan

Mallard

Pintail

Shoveller

Baldpate

Black-crowned Night Heron

Grover Blackbird

Ring-necked Pheasant.

Mourning Dove

About 30 swans were seen, and the geese numbered in the hundreds of thousands. The flocks of the Canada Goose were most abundant; snow geese, about $\frac{1}{2}$ or $\frac{2}{3}$ that number and far fewer water-frogs. Mallards were quite abundant, with pintail second in numbers, and a few shovellers and baldpates. Many ducks were seen late in the day when it was too dark to identify them. In one marshy area we saw hundreds of Night Herons, mostly in adult plumage. At about 5 o'clock a small flock of about 5 adult ♂ pheasants and 1 ♀ was seen, and single birds were noted frequently earlier in the afternoon.

Dec. 15 — The following species were noted on the refuge;

Canada Goose

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Journal

Sacramento National Wildlife Refuge
Glenn Co., Calif.

Dec. 15 (cont'd) Lincoln Sparrow

Rock Wren

Red-wing

Sparrow Hawk

White-crowned Sparrow

Mourning Dove

Marsh Hawk

Snow Goose

Mallard

Great Blue Heron

Black-crowned Night Heron

Horned Lark

Ruddy Duck

Eared Grebe

American Pipit

Whistling Swan

Ruddy Duck

Baldpate

Loggerhead Shrike

Ross Goose

Coot

Ring-necked Pheasant

Long-billed Curlew

Pintail

White-fronted Goose

Shoveller

Snowy Egret

American Egret

Savanna Sparrow

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Sacramento National Wildlife Refuge Glenn Co.,
Calif

Dec. 15 (cont'd.) Golden-crowned Sparrow

Song Sparrow

Green-backed Goldfinch

Red-tailed Hawk American Goldfinch

Golden Eagle

Downy Woodpecker

Red-shafted Flicker

California Quail (1)

The latter three species were seen in a clump of willows surrounded by a thick growth of star thistle. Also noted in this area were the other Finchids mentioned.

The white-fronted geese were noted only infrequently in the morning; perhaps they left the refuge area early to feed elsewhere. Canada geese were seen most often, and snow geese were a close second. A flock of 2 very small white geese were doubtless

Ross geese, as they seemed very little larger than the ducks with which they were associated. Two dead and partly eaten (by coyote? moon?) Ross geese were found nearby, as well as about 10 snow geese, one *Anas L. minor*, and 2 white-fronts.

At other times during the morning the following were noted:

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Meridian (and vicinity)

Dec. 15 (cont'd.) flying over a small flock of Canada geese which contained 5 very small individuals and slightly more than that number of very large "horker," probably E. C. moffatti.

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San Quentin Point, Marin Co., Calif.

Jan. 18. Just off the ferry landing,
the following species were seen:

Western Grebe
Cormorant (*P. uritus*)
Brown Pelican
Ring-billed Gull
Lesser Scaup Duck
Canvasback
Ruddy Duck
Surt Scoter
Killdeer
Black-bellied Plover
Willet
Western Gull
Glaucous-winged Gull

There were about 5 surt scoters,
mostly or all males, which seemed
to be chasing one another about
in a small circle, dipping their
heads under but not diving.

An unidentified gull was seen
leading a line of about 6 cor-
morants. All maintained the
same speed and formation (a
diagonal line) while under obser-
vation.

The weather was cold, clear above,
but with a light fog over the water.

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1947

1 mi. W. Point ~~Los~~ Reyes Station, Marin
Co., Calif.

Jan. 19 — A large flock of pine jacks
was feeding noisily in the top of a
Eucalyptus tree at 7:30 A.M.

Weather clear, cold, frosty.

Oregon juncos were also seen, and
2 Golden-eyes appeared in a small
arm of the bay.

Between Inverness and ~~Point~~ ^{Tomales} Point,
Marin Co., Calif.

Common Loon

Red-throated Loon

Horned Grebe

Ruddy Duck

Canvasback

Bottlehead

Swamp

Sooty Scoter

Western Grebe

Glaucous-winged Gull

Great Blue Heron

Red-tailed Hawk

Sparrow Hawk

Red-shafted Flicker

Say Phoebe

Meadowlark

Brewer Blackbird

Crow

White-crowned sparrow

Song Sparrow

American Pipit

Scrub Jay

Robin

Western Bluebird

~~Black~~ Drant

White Pelican

Howell, T.R.
1947

Bird Rock and other rocks off Tomales Pt.,
Marin Co., Calif.

Jan 19 — A flock of about 30 white Pelicans was resting near the top of Bird Rock, and another flock of equal size at the shore end of the Rock. Hundreds of cormorants, most of which, at least were Brandt Cormorants were on the rocks or in the water. 4 Black Oyster-catchers were resting on one of the small rocks. A pair of Harlequin Ducks was in close to shore, and a flock of about 6, mostly drakes, flew past a little farther out. 2 or 3 spotted sandpipers flew out from shore and perched on the rocks.

Western and Glaucous-winged Gulls were present in moderate numbers, and a two brown Pelicans flew by. A good-sized ~~group~~ group of western Grebes (about 25) drifted along just beyond the rocks.

Seen in a pasture while approaching the shore were the following:

Black Phoebe

Am. Pipit

Sparrow Hawk

Western Meadowlark

White-crowned sparrow

Mammals noted in the pasture and offshore were:

Deer (*O. columbiana*)

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1947

Tomales Pt., Marin Co., Calif (cont'd)

Harbor seal - 2

Whales (sp.?)

One seal lay basking in the sun on an offshore rock for some time before swimming away; the other was noted in the water nearby. The whales, which were identifiable only negatively as not Killer whales, were blowing and splashing only a few hundred yards from the shore line on at least two occasions they seemed to be in pairs. About 6-10 were seen, assuming that they were not all the same individual(s), which is unlikely as they were seen quite a distance apart.

The deer were all young does as far as I could tell, and not very wary. About 10 were seen.

At about 11:00 A.M. 4 beautiful male Harlequins and 1 female came in close to shore and walked up onto the base of one of the larger rocks. They were in perfect plumage, so that all the chestnut, slate-blue and white markings could be clearly seen.

One cormorant which was definitely a Pelagic, with distinct white rump patches, was seen. 5 more Black

Howell, T.R.
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Tomales Pt., Marin Co., Calif. (cont'd.)

Jan 19 - ~~the~~ Oyster catchers appeared,
making a big racket.

Seen on and around Lind Rock:

Surf Scoter

~~Black~~ Black Turnstone

Black Oyster-catcher

Heerman Gull

Horned Grebe

About 20 Harbor Seals

Red-breasted Merganser

At the extreme tip of the point, the
following species, as well as most of
the others previously seen, were noted:

Surf-bird - 4

Fulmar - at least 11, 2 light phase;

Short-billed Gull

The Fulmars were seen close offshore,
mostly in an area where there was
a group of sea lions. They showed
the typical "procellariid turn", pivoting
on one wing held stiffly, and
flying close to the water in the
troughs of the waves.

The surf-birds were in with a flock
of six Black Turnstones and were feeding
actively with them over mussel and
seaweed-covered rocks. One bird had
only one leg, which could be determined
for certain when he (or she) flew.

3 more Harlequin Ducks, 2 ad. ♂

100

101

102

103

104

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Tomales Pt., Marin Co., Calif. (cont'd.)

Jan 19 — and 1 imm. ♂ seen seen
in a little cave right off the point.

Along the east side of the point
Brandt Cormorants were quite abundant,
and at least one was in full, plumed
nuptial plumage. A few double-crested
cormorants were present also.

Birds seen here and not previously re-
corded were:

Golden-eye

Raven

Fox Sparrow

Ring-necked Pheasant

Also present were:

Surf Scoter

Red-breasted Merganser

Red-throated Loon

Pelagic Cormorant

In the pine woods southeast of the
point Chestnut-backed Chickadees, Pine
Siskins, and a Horned Owl were recorded.

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San Francisco, Calif.

April 11 - A single wandering tattler, in breeding plumage, was observed on the rocks below the cliff house which faces the seal rocks. Davis, Sibley and I all had good views of it. A few black turnstones were also seen.

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Nortonville, Contra Costa Co., Calif.

April 12 - The following birds were observed on this clear, warm day:

Turkey Vulture, red-tailed hawk, California quail, ~~black~~ white-throated swift, rufous, Anna, Allen, and calliope hummingbirds, western kingbird, black phoebe, Say phoebe, violet-green swallow, scrub jay, plain titmouse, Bewick wren, Canyon wren, robin, Western bluebird, blue-gray gnatcatcher, Brewer blackbird, western meadowlark, linnet, pine siskin, brown towhee, spotted towhee, savannah sparrow, lark sparrow, Oregon junco, golden-crowned sparrow, song sparrow.

Soda Springs, Placito., Calif.
May 30, 1947.

Sooty Grouse
Mountain Quail
Whiteheaded Woodpecker
Hairy Woodpecker
Amphispiza sp.

Steller Jay
Mountain Chickadee
Golden-crowned Kinglet
Ruby-crowned Kinglet
White-breasted Nuthatch
Red-breasted Nuthatch

Hermit Thrush

Western Robin

Townsend Solitaire

Mountain Bluebird

Warbling Vireo

Hermit Warbler

Vireo

Audubon "

Calaveras "

Toline "

Chipping Sparrow

Green-tailed Towhee

Cassin Finch

Oregon Junco

Fox Sparrow

5 mi SE Truckee, Ca., Calif.

May 31, 1947.

As for May 30, 1947, except the following not seen: -

Sooty Grouse, White-headed Woodpecker, Hermit Thrush, Hermit Warbler, Calaveras Warbler, Toluine Warbler;

and the following, not seen

May 30, 1947, Seen today: -

Williamson Sapsucker (1 mi. NW Truckee)

Red-tailed Hawk

Sparrow Hawk

Killdeer

Violet-green Swallow

Western Meadowlark

Brewer Sparrow (N/S)

Brewer Blackbird

Western Tanager

Lewis Woodpecker

Black-billed Magpie

White-crowned Sparrow

Song Sparrow

Red-shafted Flicker

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1946

Recurvirostra americana

Nov. 3; Bay Farm Island, Alameda Co., Calif.

As the tide began to recede from the flooded fields at the ~~east~~ west end of the island, avocets flew in from the east in flocks of 10 or 12 and alighted. They feed by dipping the bill in the water and swinging it from side to side.

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1946

Rallus longirostris obsoletus

Nov. 3 Bay Farm Island, Alameda Co., Calif.

After the tide goes out, the rails come out of the marsh grass and probe around in black, semi-liquid mud. If necessary they swim across stretches of water a couple of feet or so in width. If probing is successful, the rail comes up holding a clam or snail or mollusc of some sort in the end of its bill, and then hurries back into the marsh grass with it.

Howell, T.R.
1946

Cygnus columbianus

Dec. 14 Sacramento National Wildlife Refuge
elev. 100 ft, Glenn Co., Calif. Slightly over
30 individuals of this species were
seen on the Refuge, most of which
were in one flock. About $\frac{1}{4}$ of these
were young birds in dingy grayish
plumage. The adults seem to have
a wash of yellowish or pinkish color
over the head and upper neck. I
could not make out the yellow spot
on the ¹⁹⁴⁵~~bill~~, but they were all at long
range. The call note is a distinctive
"hooting honk", deeper and altogether
different from that of a goose. They
take off from the water only with
some difficulty, as they paddle the
water with their feet like coots.
Once aloft, flight is quite easy.

Howell, T.R.
1946

Aquila chrysaetos

Dec. 15 Sacramento National Wildlife Refuge
Glenn Co., Calif. Five of these birds
were observed perched in the same
willow tree at the same time looking
out over the marsh and deserted field
area. Their behavior while soaring
and at rest was very similar to that
of a large eagle.

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1946

Salpinctes obsoletus

Dec. 15 Sacramento National Wildlife
Refuge, Glenn Co., Calif. One was
observed in the early morning in
the unusual situation of a lumber
pile. No notes were within range.

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1946

Melospiza lincolni

Dec. 15 Sacramento National Wildlife Refuge
Glenn Co., Calif. The note of this
species is a rather sharp chip,
similar to that of a junco. Its
habitat preference is for tall dry
grass or brushy areas.

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1946

Branta canadensis

Dec. 14. Sacramento National Wildlife Refuge,
Glenn Co., Calif. — There were at least
two races of this species observed
here — leucopareia and minima. The
former is about the size of a
white-front, and is somewhat pale on
the breast; the latter is only a little
larger than a mallard, brownish (and
hence darker) on the breast, quite
short-billed, and with a high pitched
note. The races seemed to mix with
one another indiscriminately, and occasionally
with flocks of snows and white-fronts.
They preferred the drier, stubble fields,
and were observed picking gravel out
of the road.

White-headed woodpecker measurements:
Tongue beyond tip of bill 34.5 mm. (average
of two measurements). The hyoid apparatus
was found to terminate at the base
of the bill, with no indication of any
extension into the orbit.

Howell, T. R.
1948

Between Port Gamble, Kitsap Co., and Shine, Jefferson Co.,
Hood Canal, Washington

Feb. 12 - I got a good close look at a pair of American Scoters (♂ + ♀), both on the water and in flight, close by the ferry which crosses at this locality. Surf Scoters were numerous in the vicinity, and a few Western Grebes swam lazily by, one of them with one foot extended out of the water. The Surf Scoters were the only birds (except the 2 Am. Scoters) which flew as the ferry approached; the others either swam away or dived. There were 3 Guillemots observed in the crossing, one in winter plumage and 2 close to breeding dress. About 5 murres were seen, at least two in what appeared to be breeding plumage. I noticed two very small Alcids in winter plumage which I believe were Ancient Murrelets; they showed much grey on the head and back. A single Holböll's Grebe swam by close to the ferry. A few American Golden-eyes and Buffleheads were noted near Shine.

Howell, T. R.

1948

Wildcat Canyon
Tilden Park, Berkeley, Contra Costa
Alameda Co., Calif.

March 22. Single Batrachoseps attenuatus was revealed by overturning a rock. In pool underneath bridge several Triturus torosus were noted, two of which were in amplexus. The cloaca of the ♂ was much expanded, projecting laterally beyond his body contours. The stroking ~~now~~ of the cloaca by the hind legs of the ♂ and rubbing of intermandibular gland on the ♀'s snout were noted. Another ♂ approached and poked the amplexed pair; the ♂ of which sculled off carrying the ♀ beneath him. The other ♂ gave up. 2 ♀s with distended abdomens were clutching the same branch under water, apparently about to lay. (2:30 PM; H₂O temp. about 10°C 3 inches below surface; air temp 13°C) Several egg clusters were noted on a submerged bike tire. The branch with the 2 ♀s on it was removed; one ♀ dropped off. The other had the branch tightly clasped in an inverted position; with^{an} as yet unswelled cluster of eggs extruded between the animal and the branch.

Hyla regilla were croaking in the same pond; the croak is two-syllabled. A Rana aurora was noted. (Triturus torosus)

Several ♂s attacked the same ♀ at one time out in the middle of the pond.

Nine egg clusters were found on the bike tire.

In a small pool by the Clubhouse numerous clusters of Hyla eggs were found in all stages from "just laid" to hatching tad.

10 P.M.
air temp.
10°C
under
face
temp 13°C

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1948

Clubhouse, Tilden Park, Contra Costa Co., Calif.

March 22 - Two Hyla were marked thusly:



Along a small rocky stream nearby Aneides lugubris (small one) and an Ensatina e. xanthoptica were found, both under rocks. Batrachoseps were very abundant. Several Triturus were present in the stream, and ^{under a rock} another Ensatina, which rose up, and the whole tail oozed a thick milky secretion. It stood on its toes (see sketch),



Under another rock I found a centipede clutching a pale yellow egg mass, which she (presumably) was reluctant to leave but did.

2 ♀ Triturus t. loaded with eggs were found in a relatively dry spot under a rock.

An adult A. lugubris was located under bark, and a small Ensatina + minute (about 1/2") Batrach. under a small log.

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1948

Nortonville, 1500 ft., Contra Costa Co., California

April 24 - Weather clear, warm. Hours in field 10 A.M. to 5 P.M. Several Red-tailed Hawks and a single Cooper Hawk were seen soaring at about 1 P.M. At about the same hour a single Turkey Vulture appeared, and within half an hour 6 or 7 were in the air. In the late morning a single Hairy Woodpecker was observed drilling in an oak and chirping frequently. Calif. Quail were heard calling from time to time, and one pair was flushed from under an Arctostaphylos on a ~~chaparral~~^{chaparral} covered hillside. Passerines seen were: Say Phoebe - 1; Horned Lark 1; Scrub Jay - numerous; Barn Swallow - at least 5; Violet-Green Swallow - at least two; Gnatcatcher - 1; Plain titmouse - several pairs; white-breasted Nuthatch - 1; Bluebird - several small flocks; Pileolated Warbler - 2 or 3 ♂s in song; House Finch - one small flock, about 10; junco - numerous, in flocks; Lark Sparrow - 1. Other non-passerines - Anna Hummingbird - several; at least one other sp. of hummer seen, but not identified; white-throated swift - about 8 seen in mid-afternoon, high up in a flock. other passerines; a single Rufous-crowned Sparrow, singing; Brown Towhee and Spotted Towhee, numerous

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1948

4700 ft.

8 mi. N. and 13 mi. W. of Canby, Modoc Co., Calif.

May 20. 6:15 A.M. to 12 noon. Weather cloudy, cold; numerous patches of snow on the ground, and puddles with a thin film of ice in all sheltered localities. For a few brief moments the sun came out, but never for long periods of time.

I started walking west towards Hackamore ~~lake~~^{Reservoir} at about 6:15 A.M. There were numerous Black Terns cruising back and forth across the water and occasionally feeding. One pair of Canada Geese was flying about over the water honking loudly, and one other goose answered from the water. I did not see a fourth goose, but it may have been nearby but out of sight. ~~a large~~ Three Eared Grebes, apparently a male and two ♀s, were out feeding in shallow water. A pair of Mallards got up quacking. Red-winged Blackbirds sang from the shore. I turned north into a sparse yellow pine forest ^{with a few incense cedars.} Chipping Sparrows were abundant here, with Audubon Warblers in small numbers, a few Robins, and one Pileolated Warbler. Red-shafted Flickers were common and very noisy. Black-headed Juncos were also abundant. In areas with a few clumps of Arctostaphylos, Green-tailed Towhees were fairly common; they gave a one-note mewling call.

At about 8:30 the sun came out for

Howell, T.R.

1948

4700 ft.,

8m N. and 13 mi. W. of Canby, Modoc Co., Calif.

May 20 - (cont'd.) a few minutes and warmed things up a bit. Olive-sided Flycatchers began calling, and a small Empidonax with a note which sounded like "whit!" became active; ~~in~~ it never perched higher than 4 or 5 feet off the ground while I watched. In an area that was slightly more open and cleared, with a few dead pine stubs and scattered clumps of Arctostaphylos, the following birds were seen: Mountain Chickadee (singing); Pygmy Nuthatch (pair); white-breasted Nuthatch; Chestnut-backed Bluebird (flock); Williamson Sapsucker (1 ♂); Red-breasted Sapsucker (probably a ♂; collected + pickled; one seen + not collected, one seen later + shot — same one?); White-headed Woodpecker 1; Purple Finch (flock); Fox Sparrow (several pairs); Junco (flocks); Calliope Hummingbird (numerous); Swallow — Violet-green? (several seen flying over); Green-tailed Towhee (numerous); Tolmie Warbler (1 ♀); Black-throated Gray Warbler (about 5 or 6); Chipping Sparrow (numerous); Empidonax sp. (numerous). Small flocks of California Gulls and Black Terns were seen flying over towards the lake. Red-shafted Flickers were common here as elsewhere. About half way between this place and camp I ~~on~~ collected a Solitary Vireo which was hopping about in a Yellow Pine.

Chipmunks were very common everywhere,

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1948

8 mi. N. and 13 mi. W. of Canby, 4700ft. Modoc Co., Calif.

May 20 - (cont'd) and a few Golden-mantled Ground Squirrels were seen. I noted numerous deer tracks and saw at least 3 and probably 4 or 5 deer.

May 21 - weather still cold (34° at dawn) with intermittent light rains - most of the snow melted. No sun from dawn to 12 noon.

I took a trail heading south through yellow pine, manzanita, and occasional incense cedar. A Mourning Dove flushed from the ground just outside the abandoned barracks where we are staying, and a few Steller Jays set up a racket. A light drizzle began. I noted a Purple Finch singing, a small flock of Bush-tits in a manzanita clump (I collected), a Fox Sparrow (collected), a Black-throated Gray Warbler, and two more Steller Jays.

I collected one (a ♀); the other I presume to be its mate, for it followed me and scolded for about 75 yds. Farther along the trail were Calliope Hummers, Chipping Sparrows, and Audubon Warblers, Flickers called occasionally. After 3 unsuccessful attempts, I finally brought down a white-breasted Nuthatch with a .38 aux. The bird was utterly fearless, and the shot spattering on the bark seemed only to make it curious. A solitary Solitary Vireo was nearby.

Howell, T.R.

1948

8 mi. N. and 13 mi W. of Canby, 4700 ft., Modoc Co., Calif.

May 21 (cont'd) - I had now made a semi-circle and was back at camp; I turned west and walked along the edge of the Hackamore Reservoir. The vegetation on this shore is sagebrush and very small pine trees. Juncos, Chipping Sparrows, Audubon Warblers, Black-throated Gray Warblers, *Empidonax*^{sp.}, and Green-tailed Towhees were abundant. Black Terns were in good numbers over the water, a few California Gulls passed over, two Canada Geese were visible from the shore, and several Barn Swallows fed low over the water. Robins were in ~~the~~ small numbers in the pines.

I encountered a flock of warblers moving along the shore in the manner of migrants; most were Audubon and Black-throated Grays, but there were a few Townsends^(1. coll.) and Pileolateds. The Townsend warbler I collected was slightly fat. A Pygmy Nuthatch called loudly from a large dead stub; I watched him investigate an old woodpecker hole and then collected him. Several Mountain Chickadees passed through the trees calling but not singing.

I turned southward again and walked to the same area mentioned in yesterday's notes which is somewhat cleared but with numerous large dead trees. Flickers were about and calling; I located a White-headed Woodpecker (a ♀) and collected it; no others of this species were seen today. Fox Sparrows



Howell, T.R.
1948

8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.
May 21 - (cont'd.) - were singing, even in fairly heavy rain. They seem to be paired off at this time. A Red-breasted Sapsucker, typical daggetti, flew in to a large dead stub and began to peck around the loose bark (see species account for details on this) and a ♀ Williamson Sapsucker was also around. By this time it was 11:00 A.M. and rain began to come down steadily; I went back to camp.

At 3:00 P.M. the clouds broke slightly and the sun came out. I went back to the "Sapsucker Grove" and found a Red-breasted, almost certainly the same one again. It showed no effects from the shot I took at it this morning other than a wary disposition. It was constantly giving a whining, nasal cry which is nevertheless reminiscent of a jay's call. I couldn't get close enough for a shot. A Green-tailed Towhee came out of the manzanitas to feed on the ground; he (it) scratched with both feet just like a typical Pipilo.

I saw a lone Olive-sided Flycatcher but did not hear it or any other one call. A few Chestnut-backed Bluebirds came by, and Mountain Chickadees were singing. A ♂ Williamson Sapsucker was noted. A Red-tailed Hawk soared over, and shortly afterward another which was quite dark (melanism?) on the underparts.

The only mammals seen were a few chipmunks and Golden-mantled Ground Squirrels.



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8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.

May 22 - 6:00 A.M. to 11:00 A.M. - Weather clear, not very cold (several degrees above freezing, at least). I went to the same locality as on the previous day, by the same route, in order to observe the Sapsuckers (see species account). There were at least 10 Canada Geese on the Reservoir, one Eared Grebe, one Mallard, and numerous Black Terns and a few California Gulls. Red-wings were in song. In the small pines along the shore I saw one White-headed Woodpecker, numerous Chipping Sparrows, Juncos, and Audubon Warblers. I collected a Warbling Vireo in a small pine: the bird was fat and doubtless a migrant. In the "Sapsucker Grove" were 3 sapsuckers (~~daggetti~~) one ♀ Williamson Sapsucker, one Hairy Woodpecker, several Flickers, Calliope Hummers, and one or two Red-tailed Hawks. I collected an Empidonax which had a 2-syllabled "che-bic" call. ~~A~~ Tree Swallows (one pair) were nesting or starting to nest in a woodpecker hole about 40 ft up in a dead pine; the birds went in and out of the hole repeatedly, and one of them chased after a Red-tailed Hawk which flew close by. Olive-sided Flycatchers were calling frequently, and Pygmy Nuthatches and Mountain Chickadees were also noisy. I watched a ♀ Chestnut-backed

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8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.

May 22 (cont'd.) Bluebird carrying nesting material (long strands - grass or pine needles?) into an old woodpecker hole about 10 ft up in a dead pine stub 16-20 ft. high. Other Bluebirds of the same species were in the general area, seemingly paired off. A few Solitary Vireos sang, as did some Audubon and Black-throated Gray Warblers. A single Pileolated Warbler (♂) was seen at close range in the manzanita. In the distance I heard Mountain Quail calling but was unable to call them up. Purple Finches were numerous and in song, as were the Fox and Chipping Sparrows. Juncos were common, Green-tailed Towhees less so. I noticed a Fox Sparrow which was singing from a perch drop down and start to drive a Towhee from its territory and then changed its mind as though it recognized a different species.

In the afternoon at about 3:00 P.M., while I was watching sapsuckers, I saw ~~about~~ about 50 White Pelicans sailing over very high in a general northerly direction. They were in two V-shaped flocks of about equal size.

Two Killdeer were seen in the ^{wet} grassy flat at the eastern tip of the reservoir. Around the barracks were several Mourning



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8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.

May 22 - (cont'd.) Doves and Robins.

In the "Sapsucker Grove" there were lots of chipmunks and quite a few Golden-mantled Ground Squirrels. The chipmunks seemed to be paired off but not the squirrels. I saw what I am reasonably sure was a Chickaree, at a good distance. One Rabbit (Sylvilagus nuttallii), a ♀, hopped out from among the manzanita and I shot it. I saw only one deer today, in a grove of small pines.

May 23. Same locality: weather clear, warm. I went straight to the "sapsucker grove", noting Juncos singing and a ♂ Western Tanager along the way. A Green-tailed Towhee was also in song, and it reminded me slightly of the song of the eastern Red-eyed Towhee. It goes "chewink-SEE, chep-chep-chep."

There were two Red-breasted Sapsuckers in the grove (see species account), and the usual Flickers, Bluebirds, Purple Finches, Empidonax, Pygmy Nuthatches, Chipping and Fox Sparrows, Black-throated Gray Warblers, and several Western Tanagers, Hairy and white-headed Woodpeckers. I saw a large Accipiterine hawk, presumably a Goshawk, fly by in the distance carrying some sort of prey. At 8:30 A.M. I walked west for

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1948

8 mi. N. and 13 mi. W. of Canby, 4700ft., Modoc Co., Calif.

May 23 (cont'd.) about a mile. I encountered more white-headed Woodpeckers, a pair of white-breasted ~~Nuthatches~~ Nuthatches, a Townsend Warbler, and flushed a pair of Mallards out of a very small shallow pond. A few steller Jays were about and I collected one. I came to the edge of the reservoir and noted 5 Canada Geese on the water and Audubon Warblers and Robins in the trees along the shore. There were a number of Ground squirrels out in an open meadow with a small pond in the middle of it. Black Terns were common over the reservoir, California Gulls less so.

I returned to the Sapsucker Grove and noted Red-tailed Hawks, Tree Swallows, olive-sided Flycatchers, and Solitary Vireos singing. I saw a Pygmy Nuthatch fly out from a dead tree and catch an insect in mid-air. Mammals in the area were 3 deer, numerous Chipmunks and Golden-mantled Ground squirrels, and a few noisy Chickarees.

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KRE Pond, Aquatic Park, Berkeley, Alameda Co., Calif.

Aug. 8 — The pond is very much dried up at this date with a heavy layer of scummy green vegetation covering most of the water that is left. On one small open spot there were 2 phalaropes, one Northern and one Wilson (Lobipes lobatus and Steganopus tricolor) and a Bonaparte Gull (Larus philadelphia) in winter plumage. The Wilson Phalarope was pursuing some sort of flying insect which alighted in swarms over the scum and quiet water. The phalarope was very quick and active in its feeding, attempting both to snatch the insects from the surface as well as catch them as they flew off. It seemed to be moderately successful at catching them by both methods. The Northern Phalarope was much less inclined to feed on the insects, and made only an occasional pass at them. Even the Bonaparte gull snapped at a few as it swam about. Four Mallards (none drake-feathered) were present, and numerous Barn Swallows, Forster Terns, Bonaparte Gulls (both summer + winter plumages), Western + California Gulls, 3 Farallon Cormorants, and 9 White Pelicans were seen soaring over at a good height.



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~~1948~~ 1949

Twin Spring, 38 mi NNW of Alturas, H,
Modoc Co., Calif.

May 20 - I arrived at Twin Spring about 1:30 this afternoon after a tough drive from Alturas. The first 10 mi of the road were very muddy and slippery, but after that it was dry and easy driving. The Crowder Flat Ranger Station is $\frac{3}{4}$ mi away but there is no one there now - the ranger at Canby said they expected to have a man in there on the 11th of June.

The weather is cool and alternately cloudy and sunny today. I took about an hour's walk around Twin Spring hoping to find sapsuckers. There are Flickers, White-headed Woodpeckers, Hairy Woodpeckers, but I have not seen sapsuckers. There is a small creek with numerous aspens along it which show old signs of sapsuckers. The rest of the trees are mostly yellow pine.

There is a pair of red-tailed hawks which must have a nest close by as they are much disturbed at my presence. One, possibly the male, is melanistic - almost solid black on the underparts except for the tail and wing feathers.

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~~1948~~ 1949

Twin Spring, ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 20 (cont'd.). This black one followed above me off and on for the whole hour, screaming and occasionally diving towards me, pulling up about 40 ft overhead, though. The other bird was the usual light color, and I have seen it only once.

Other birds noted were Robins, House Wrens (singing vociferously), Mourning Doves, Audubon Warblers, Black-headed Juncos, Mt. chickadees, Steller Jays, Purple (Cassin?) Finches, Chipping Sparrows. I startled one deer, a doe, out of a meadow, and Golden-mantled Ground Squirrels and Chipmunks are abundant.

May 21 sometime during the middle of the night I was awakened by a terrific racket as though someone were trying to chop up the shack with a hand ax. I turned the flashlight on, got out of my sleeping bag and went over to where the noise came from; it was a porcupine gnawing on the floor.

It began to get light at around 4:00 A.M. but I dozed off until 5:45. By a little after 6:00 I was down at the part of the meadow where

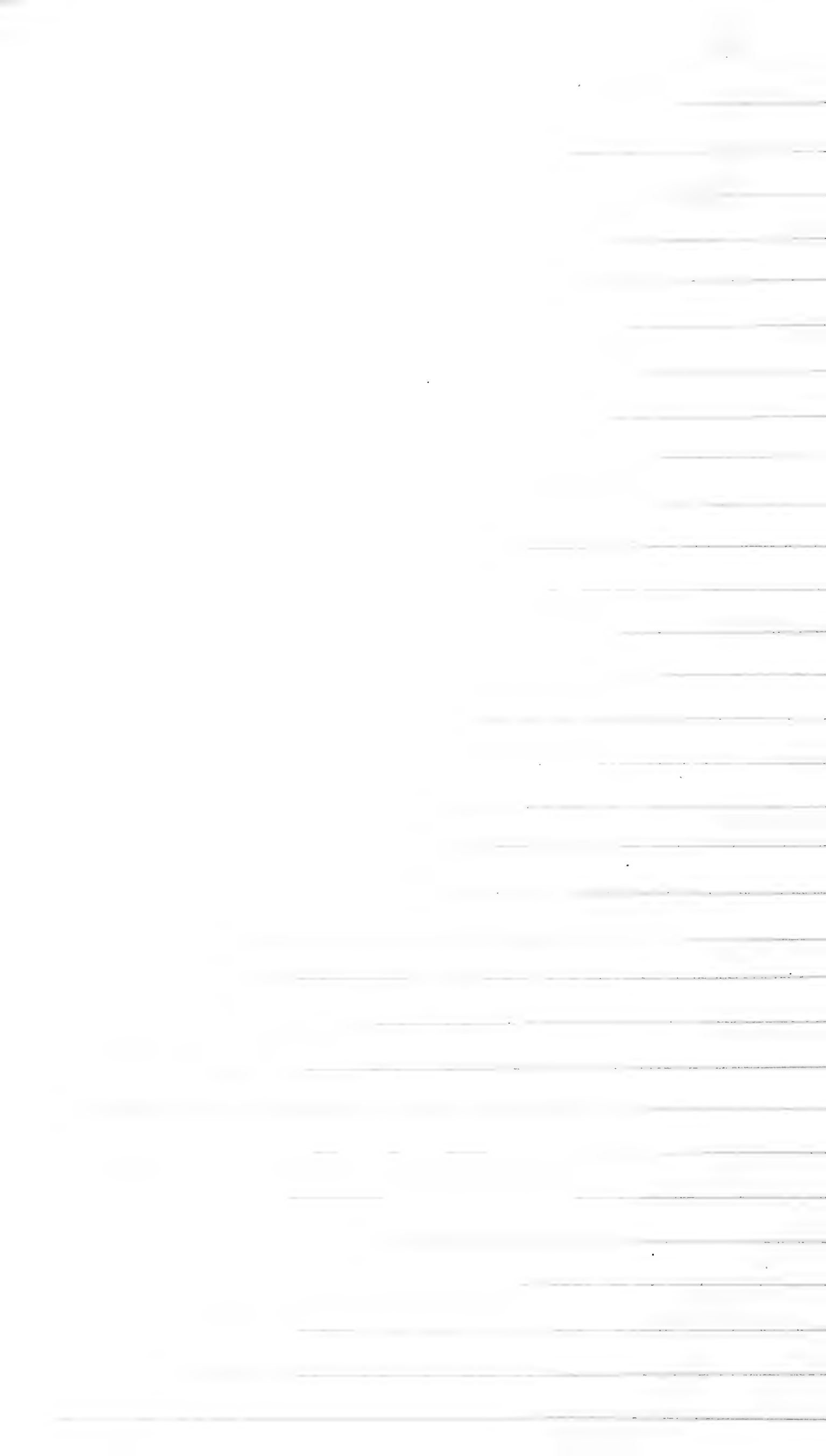


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~~1948~~ 1949

Twin Spring, _____ ft., 38 mi NW of Alturas,
Modoc Co., Calif.

May 21 (cont'd.) aspens are thickest. On the way I noticed Solitary Vireos, House Wrens, Mourning Doves, Steller Jays, Black-Headed Juncos, Mt. Chickadees, White-headed Woodpeckers, and Red-tailed Hawks. 4 small Canada-type Geese got up from far down the meadow and went honking away. I located a Hairy Woodpecker and finally one Sapsucker (see species account). I turned back and walked down to Willow Creek where I found ~~another~~ pair of sapsuckers (also see sp. account).

The meadow is large and dotted with small ponds here. There are several redwings in it, at least one Wilson Snipe (seen and heard), one pair of Mallards and 4 ♂ Mallards, Killdeer, 4 Violet-green Swallows and one Barn Swallow. I walked a long way up Willow Creek and still could not find another sapsucker. There was evidence of their workings in many of the aspens and some of the small yellow pines, but I did not see nor hear any, although I did see a Hairy. Many of the aspens are felled and look long dead, but I



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Twin Spring, — ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 21 (cont'd.). noticed one that was
freshly felled, apparently by a beaver
as it had tooth marks all over the
cut ends. There are a couple of
dams along the stream, but they are
small and could conceivably be just
pile-up of sticks drifting downstream.

Two pairs of Sapsuckers, both mostly
daggetti, is too damn few for a
study. If I can't find more, including
some nuchalis, I will have to pull
out of here and look elsewhere.

6:45 P.M. More fruitless searching for
nuchalis. I must be too far west
or too low. Probably the best idea
would be to spend one more day
searching around here and then to
try farther east. After walking
myself to a frazzle I still have
found only two nests, both daggetti
or mostly so, and even the daggetti
few and far between. I have seen
for certain a total of only 5 s'suckers.
Perhaps Russell and Hildebrand cleaned
out the population here last year—
I came in here on the strength of Russell's
remark that they were "thick."

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1949

Twin Spring, ft., 38 mi. NNW of Altuzus,
Modoc Co., Calif.

May 22. Awoke at 4:00 A.M. when it was already getting light. I could hear Robins and Solitary Vireos singing, but did not distinguish others. Went down to S'sucker (or Saps.) nest #2, arrived by 5:30 A.M. Skies mostly clear, a few clouds in the east. (see sp. account for Saps.).

Deer were ~~ab~~ around, as always. Chickadees + Juncos sang. Green-tailed Towhees were mewling back and forth in the Sage. Flickers and Steller Jays called. A pair of Red-tailed Hawks have a nest high in a yellow pine near Saps. nest #2, and they (or rather, usually one) circle over me and scream constantly. At 5:50 the first sunlight came from behind the clouds. I walked up in the yellow-pine-manzanita area up above the willow creek meadow. A ♂ Western Tanager was singing, as were Black-throated Gray + Audubon Warblers. A small Empidonax is also around, calling. Saw a Pygmy Nuthatch. Juncos and Chickadees abundant, as are chipmunks, golden-mantled ground Squirrels, and Chickarees. I found another pair of typical daggetti, in aspens, with a pr. of ~~pr.~~ Chestnut-

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Twin Spring, 8 ft., 38 mi. NNW of Alturas,
Modoc Co., California

May 22 (cont'd.) - backed Bluebirds, House Wrens, and Juncos. (See sp. account). Violet-green Swallows flew by. A few yards away (about 50) were at least one pr. of Hairy Woodpeckers. White-headed birds were seen earlier, in the pines. I returned to Twin Spring and walked down the road toward Crowder Flat, $\frac{3}{4}$ mi. away. Here I encountered a small ⁽¹⁰⁾flock of Red Crossbills and got two after a long chase. Some were in streaked immature plumage, and I noticed in one instance an adult and a young one going through the motions of feeding - I could not see food pass between them, but the young one begged and the adult reached out with its bill. They were all busy on the yellow pine cones. White-breasted Nuthatches were seen and heard, as well as Brewer Blackbirds in the wet meadow at Crowder Flat. Mourning Doves are heard constantly. I then walked down about a mile south of Crowder Flat to ~~the~~ near the Janes Reservoir, which is out in the middle of a Juniper-Sage flat. I noticed a ♂ sparrow hawk and chipping Sparrows

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Twin Spring, _____ ft., 38 mi NNW of Alturas,
Modoc Co., Calif.

May 22 (cont'd.), Several Black Terns were seen flying about over the reservoir and calling. The day was getting quite hot (fortunately, for a change) as there was lots of sun with occasional clouds. I returned to Twin Spring, without seeing anything not previously mentioned, at 11:43 AM.

2:45. I saw my first snake — a small, 18" brown racer in the dry sage near Saps. nest #2. I should mention here that there are two pairs of Red-tailed Hawks in the area; one (melanistic and normal) is close to the shack at Twin Spring, and the other, two normal birds (one a bit dark) about 50 yds from Saps. nest #2. I have seen both the nests — high up in living yellow pines.

3:45. Found a Hairy Woodpecker nest in an aspen 3 ft. off the ground which has a least 2 hungry, naked and vociferous young. Also at this spot I collected a garter snake. About 100 yds further, at Saps. nest #1, I saw several more Red Crossbills, even perching 10 ft up in a dead aspen.

May 23 — clear, sunny, hot at midday. The same birds were noted in the

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Twin Spring, _____ ft., 38 mi NNW of Alturas,
Modoc Co., Calif. May 23 (cont'd.)
area today, with 3 additions—
at Crowder Flat, 2 Turkey Vultures
soared over, and very high up I
saw 7 White Pelicans circling.
A few Evening Grosbeaks were seen
and heard. Carpodacus sp. (I
believe purpureus) were seen both
yesterday and today.

I have now moved in to a cabin
at Crowder Flat, thanks to the
unexpected arrival of 2 Forest
Service men at the ranger station.
Nearby I noticed another Garter Snake
and Sceloperus of sizes from small
to full-grown. Some kind of batrachian
is croaking in the meadow. -10. P.M.

Crowder Flat, _____ ft., 38 mi NNW of
Alturas, Modoc Co., Calif.

May 24 - Awoke at 4:30 A.M., daylight
already well along, damn it. The sky
was perfectly clear, and has remained
so.

At 5:15 I heard Flickers for the first
time in the day. The earliest singers
I noticed are the Robins, Chickadees,
Solitary Vireos, but perhaps they are
just closest to my cabin. I heard
them on awakening, at 4:30 A.M.

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Crowder Flat, ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 24 (cont'd.) [See sp. account for notes on sapsuckers]. Chipping Sparrows are singing from the tops of small pines 10 or 15 ft. high, and juncos and finches from all heights. Solitary Vireos also range high, and the Empidonaces are common in the aspens and high in the pines. I saw an Olive-sided Flycatcher in the top of an aspen, but did not hear it or any others. Audubon and Black-throated Gray Warblers are singing, as well as a number of Pileolateds, which I have not noted before. A pair of Warbling Vireos in a group of aspens seemed disturbed by me. One scolded harshly from a few feet away then suddenly sang, then scolded again and sang some more. Hairy and White-headed Woodpeckers are active and noisy, as are the Red-tailed Hawks. I see lots of Brewer Blackbirds in the meadow.

In the aspens by nest #3 I noticed the usual Juncos and House Wrens singing. Violet-green Swallows flying by, ~~an~~ Chestnut-backed Bluebirds, Empidonaces, and a Western Wood Pewee (first one).

In the pines I came upon an injured ♀ crossbill, undoubtedly one that I shot

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Crowder Flat, _____ ft, 38 mi NNW of Alturas,
Modoc Co, Calif.

May 24 (cont'd.) at on May 22 and thought I had missed. The bird was hopping on the ground, and I caught it easily.

At the edges of the meadow I have noticed a few Citellus sp., not beechyi. They are about the size of the Golden-mantles.

Steller Jays are about, as are both Pygmy and White-breasted Nuthatches. I saw Green-tailed Towhees and heard them singing in the Manzanita. I have not seen any Fox Sparrows.

Crowder Flat, I should mention, is a slightly rocky wet meadow with a small stream running through it, and there are clumps of aspens distributed irregularly along its borders. There are several similar meadows nearby. The rest of the country is forested mainly by yellow pines, with a few junipers and other trees I do not know scattered throughout. Arctostaphylos is fairly abundant, but does not seem to be at its best here. There is no incense cedar (Libocedrus). I have noticed a great deal of a prostrate Ceanothus growing on the forest floor.

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Crowder Flat, _____ ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 24 (cont'd.) Much of it is in bloom now, with bright blue flowers when fresh, fading to pinkish blue and almost white. The meadows are full of buttercups (*Ranunculus*). Farther away from the streams are Juniper + sage flats, very rocky.

About 3:00 P.M. — In the aspens near nests #1 and 6, I noted Pygmy Nuthatches, House Wrens, and Violet-Green Swallows all with nests, or at least going into nesting holes in the aspens. At the edge of the meadow, where there are large rock piles (sloping abruptly up to the pines and junipers) with grassy spots in between, I noticed a Blue-tailed Skink (*Eumeces*) scurry off a rock where it had been sunning. There are lots of very blackish Sceloporus around, and several garter snakes.

7:15 P.M. Noticed about 3 bats flying over the meadow. 7:45 I passed a porcupine in the middle of the meadow on his way across. I poked him with a stick, which he stopped with his tail several times, then he went back to the woods at a rapid shuffle.

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Crowder Flat, _____ ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 25 I had to spend most of the day at Alturas getting car repairs and spotted fever shot. At Alturas, around noon, I noted yellow Warblers singing, saw them, Bullock Orioles and a flock of about 20 Tricolored Redwings, about equally ♂s and ♀s. The latter were feeding on the courthouse lawn.

On the way to Alturas at one of the big reservoirs I saw many Black Terns, some Mallards, and a Western Willet. There were Black-billed Magpies and Mt. Bluebirds in the Juniper-Sage flats. Saw one woodchuck also.

Back at Crowder Flat at 6:00 P.M.

I noted Brown Creepers in the pines, which I had not seen before.

May 26 9:30 A.M. Drove out the Blue Mt. road to Quaking Asp spring. It is mostly juniper flats with some big clumps of yellow pine between.

I ran over a gopher snake on the way and saved him as a specimen. ^(Pituophis)

Noticed a few Scrub Jays, and collected one. They were in the low junipers.

Noted a Sparrow Hawk pursuing a Red-tail. Nothing at Q. A. Spring but a lot of Doves.

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1949

Journal

Alturas, Modoc Co., Calif.

May 27. I had to come into Alturas for the day for car repairs. This is a day wasted as far as the birds are concerned.

I have so much writing to do in the species accounts that my journal is somewhat fragmentary. There is not too much point in my listing each resident species seen daily, but I shall instead note species not previously seen and any interesting behavior of those already mentioned. A daily list would be somewhat deceptive, as in concentrating on the sapsuckers I have not time to look at every bird or ~~to~~ follow up every song as I would if this were a collecting trip.

I have not seen any bucks or fawns, but I have seen buck tracks. At least, I have not seen any deer with antlers.

Road to Crowder Flat, ft., 30mi NNW of Alturas, Modoc Co., Calif.

May 28. Weather sunny but with clouds. Found a dead Blue Racer (Coluber) in the road and preserved it. Saw another crossing the road a few miles farther on. 3:00 P.M. Rainstorm - very windy.

May 29. Still overcast and rainy. Around

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Journal

Crowder Flat ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 29, (cont'd) 5:00 A.M. I heard Robins singing and chickadees and Flycatchers calling. Later, Warbling Vireos and Chipping Sparrows sing, Flickers and Steller Jays calling. At 1:30 P.M. the rain stopped for a while and I went outside - saw a Robin bathing in the creek, on such a wet day. The Flycatchers are active about the cabin. Rain all the rest of the day, far into the night.

May 30 Day started off with intermittent sun and showers. By 1:30 P.M. the sun had gone, and a hailstorm began. Needless to say, my field activity has been curtailed. 2:15. Noted a flock of Red Crossbills (about 8) in the pine tops, calling and feeding.

May 31. At 12:40 A.M. I heard heavy rain on the roof, which continued until about 3:00 A.M. At 3:40 the skies were getting light, and I heard a Robin singing. As it became lighter, I was astonished to see that a moderate snow was falling. This changed to slush about 7:00 A.M., and by 8:00 A.M. had changed to light rain, but there are still big patches of snow at 8:30 A.M. In

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Crowder Flat, ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 31 (cont'd.) addition to the Robins, the Flickers, Chickadees and Brewer Blackbirds are calling, the Flycatchers also, and Chipping Sparrows singing. The saps. + white-heads^{are} also active — see sp. account.

9:30 A.M. Still overcast, rainy. I met Mr. Archer of the Willow Creek Ranch on the road going out to cut wood. He remembers when W.P. Taylor and Ned Bryant ran their transect of the Warner Mts. back in 1910. He gave me a ride down toward Willow Creek. I walked along the creeks towards nests #2 and 7. Here I saw my first Fox Sparrow in a clump of very small aspens and pines — not a note from him. I also saw a Black-billed Magpie out over the meadow.

10:45 — At nest #7, 3 Great Blue Herons flew over, croaking and squawking a going from ~~the~~^{one} high top of yellow pine to another. 2 more Magpies came by, calling. There was a great deal of rain the rest of the afternoon, even a flurry of hail, and I felt so feverish and shivery that I could do nothing the rest of the day but huddle in the sack.

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1949

Journal

Crowder Flat, 5200 ft. 38 mi. NNW of Alturas,
Modoc Co., Calif.

June 1 - Today I have spent recuperating - most of the fever is gone but my eyes are still pretty hot and sore, especially when I try to read or write anything. The weather is clearing, with some sun, but still showing rain clouds although no rain.

June 2. I spent most of the morning giving some help to Jesse Drake of the Forest Service, whose pick-up truck was mired down in the road to Weed Valley west of here. At 10:00 A.M. I heard and saw a flock of about 10 crossbills, and saw others later in the day. Weather mostly clear, occasional clouds. See sp. account. Locality - Juniper Spr., 2 mi. W. Crowder Flat.
4:00 P.M. - Back at Willow Creek.

I scared a Green-tailed Towhee off its nest in a sage bush, a few inches off the ground. There were two young, looking almost newly hatched, which were orange brown on the bare skin with a few tufts of dark grey down. One egg remained - it was patterned like this →  ground color white, speckles gray-brown.

June 3 - Tree swallows noted for the first time; see sapsucker species account.

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1949

Journal

Alturas, Modoc Co., Calif.

June 4. I had to go into Alturas today for mail and some supplies, and I decided to spend some of the day looking around that area. I drove across a low pass in the Warner Mts. to Cedarville, over to the east. There were a number of aspen groves beside the road, and I stopped at two of them for a brief look. I saw very few sapsucker workings and no nests, but I could easily have missed them in such a short time. The altitude was around 6000 ft in this area; I noticed Pine Siskins for the first time. Next, in the afternoon I drove to Canby and beyond on the main Hwy. to Klamath Falls. There is a place a few miles to the west of Canby called Howard's Gulch (on Forest Service maps) which has some large aspens in it. Here, at 2:15 P.M., I located a nest with young in it, being fed by a daggetti. It was about 7 ft high, in a large (14 in diameter) aspen which had other holes. The young were naked, pink, and active and noisy in a feeble way. I could not tell how many there were as they moved around so much, but there seemed to be at least 3. The parent brought them what looked like big ants in its beak.

On the road to Crowder Flat I noted a Willet, a Calif. Gull, and a Western Kingbird.



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Journal

Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

June 5. Weather clear, warm, windy at times. A new bird from the area noted today is the Nighthawk (Chordeiles minor), which I heard in the morning and later saw in the afternoon — 3 birds over Crowder Flat, very high up.

While looking for more sapsucker nests near #6, I looked into a hole 4 ft up in a dead aspen. A sort of hissing, thumping noise began immediately and gray dust came rising out of the hole. This proved to be the doing of a Mt. Chickadee which remained on the nest. It seemed to be raising and lowering itself with some wing motion as well. See today's saps. species account for notes on a House Wren chasing a chipmunk.

June 6 — Up at 3:05 A.M., faint signs of dawn in east — clear with a few small clouds. At 3:20 I heard Chipping Sparrows singing, and by 3:45 most of the passerines were singing or calling — Juncos, Robins, Vireos, Warblers, Sparrows, Blackbirds, Flycatchers. At 3:45 at the Willow Creek Meadow I heard a Poor-will for the first time; it was getting pretty light by then. No woodpeckers were heard until a little after 4:00 A.M.

At 8:00 A.M. I went out with Drake

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

June 6 (cont'd.) to several of the springs on the ~~the~~ only road to the east of here. It is not bad now that it is dry, but there are some very rough parts and several trees across it. The springs are Tournquist, Wall, Mouse, and Rail Springs; only at the latter ^{one} are there any aspens. These are a small clump, and showed many old workings but no nesting holes. At Wall Spring at 10:15 A.M. I saw a daggetti nuchalis in a dead pine snag; it had rather definite head stripes, but no breast band.

At Rail Spring there is a small pond which harbors Red-wings, and Killdeer are around the edges. They are probably nesting, as one of the Killdeer went into a possible distraction act, spreading its tail, tilting it to the left, and chattering. Also, there is another black Red-tailed Hawk here, screaming as though a nest were near.

Arrived at Forked Horn spring about 3:00 PM; there is a grove of good sized aspens in this flat, (not very near the spring), but I did not have time to investigate it. There is no road out to here — just a cross-country drive. Back to Crowder Flat at 6:00 P.M. All localities mentioned are on Forest Service maps of Modoc Nat'l. Forest.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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June 7 - Up at 3:05 A.M. again. I heard the first birds - Robins - at 3:30. At nest #1 I heard Olive-sided Flycatchers (singular?) at about 4:30 A.M. - I had seen one before, but this is the first time I heard one. The Steller Jays do not seem to get noisy until 5:00 A.M.

Crossbills, I find, are very common in the area, going in flocks of 5 - 10. I frequently see them in the low deciduous trees in the meadows.

During the day I heard lots of Olive-sided Flycatchers, which is a bit strange as I had not heard any before.

At 3:45 P.M., by nest #6, I came on a Mourning Dove sitting on its nest on a flat place on a fallen yellow pine log, about $3\frac{1}{2}$ feet above the ground. The bird would not flush until I came within a yard of it. In the nest were two squabs sitting very quietly, about $2\frac{1}{2}$ inches long, dark grey skin, and almost completely covered with cream-colored down.

At 6:30 P.M. I found a small rubber boa (Charina bottae) in the path just above the meadow by the ranger station. It is about 8 inches long, pinkish brown or cinnamon in color on the dorsum and more yellow ventrally. I am saving it alive. The skin is very soft and silky.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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June 8 - weather clear at dawn, becoming somewhat cloudy by mid-morning; colder than the previous day. I noticed a cottontail rabbit behind the woodpile by the Ranger Station. Olive-sided Flycatchers are calling again. At 12:30, by the Ranger Station, I got a good look at a Yellow-billed Cuckoo in an aspen. This is a new bird for the trip. See saps. sp. account for mention of Williamson Sapsucker, also new for the trip.

At 5:30 P.M. I collected a small Empidonax (♂) by the Ranger Station. I am still not sure of the species, but they are common along side the meadows here. Their call note is 2-syllabled.

Since I have been at Crowder Flat I have noticed 3 garter snakes at exactly the same spot by a culvert almost every time I pass there. The largest is about 2 ft long, the smallest about 18 inches. The other is intermediate between these two in size. Garter Snakes are extremely common in the wet meadows.

June 9 - weather clear and warm. At 2:50 P.M., as I was leaving nest #7, I saw an adult Goshawk fly by silently. This is the first one of this species I have seen in this area.



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June 10. Up at 5:00 A.M., - weather clear, warm. At about 9:20 A.M., near nest #7, I flushed a Green-tailed Towhee from its nest just about on the ground in a sage bush. It contained 3 well-fledged young that I could see; perhaps a fourth was underneath.

Late in the morning I collected a couple of Steller Jays, which are very numerous and noisy around here. One was an immature ♂; perhaps the jays have finished nesting already.

June 11. Noted a juvenal Junco flying about, apparently just out of the nest. The parents were nearby, and very nervous.

In the afternoon I went to the Willow Creek Ranch $3\frac{1}{2}$ mi. from here. There is a big wet meadow there and I saw Wilson Phalaropes for the first time. It is an interesting place, and I think I will go back there for some collecting later.

June 12 Near nest #3 - in fact within 15 yds of it I noticed a Western Wood Pewee nest about 20 ft up in a dead aspen. Nest #3 seems to be a rich spot; in the same tree as #3 are Tree Swallow and House Wren nests, and a few yards away are the Pewee nest and one of the Chestnut-backed Bluebird. Probably there are others.

In the early afternoon I went over to the

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June 12 (cont'd.) Willow Creek Ranch, $3\frac{1}{2}$ mi. S. of Crowder Flat. Here I collected a pair of Wilson Phalaropes; several others were seen. They must nest in the big wet meadow here as the ♂ had a well developed brood patch. The ♀ was slightly fat. Birds seen at the Ranch were as follows:

Black Tern, Western Kingbird, Black-billed Magpie, Barn Swallow (1st noted in area), Violet-green Swallow, Killdeer, Red-wing, Western Meadowlark (1st record for area). Both swallows were common, as were the Terns out over the meadow.

After skinning the birds I went to Twin Spring for water and cut a tire open on the way, which curtailed my activity for the little remaining of the afternoon. I will have to go in to Alturas and buy another spare, I suppose, tomorrow or Tuesday. The car could use some gas and a grease job, anyway.

June 13 - 6:00 A.M. to 9:00 A.M. I walked around near the ranger station looking for something to collect. I noted Chipping Sparrows and Robins feeding young fully fledged and out of the nest. The food consisted of small green hairless caterpillars. In an aspen, about 5 ft above the ground I located an Empidonax nest with four white unspotted eggs. The bird on the nest flushed silently at my approach, and both parents returned in a few minutes as I stood quietly a few yards away. One sat on the eggs, and the other took

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June 13 (cont'd.) up a vigil close by.

I saw a daggetti feeding low in a mountain mahogany, and it flew off without a sound; where, I could not see.

In a large dead yellow pine, about 10 ft. up, I saw a Pygmy Nuthatch go into its nest hole with food. This nest is really in a crack rather than in an excavated hole.

I am about ready to give up on my .32 auxes; they just won't kill anything, even at ranges within 10 yds, when I was afraid I would blow the bird to pieces. I have shot at Nuthatches and Warbling Vireos with no apparent effect.

There are many young ground squirrels about, and I noticed several rabbits, presumably S. nuttalli, in the area.

At 11:03 by nest #1 an adult Goshawk flew by, pursued by what I think was a Brewer Blackbird.

2 mi. N. of Alturas, 4370 ft., Modoc Co., Calif.

June 14 - I drove to this marshy spot in mid-morning. There were lots of Yellow-headed, Brewer, and Red-winged Blackbirds, Black Terns, Willets, one perching on a telephone pole. In addition, I saw Wilson Phalaropes, Coots, Cinnamon Teal and Wilson Snipe. I noted an adult Marsh Hawk being pursued and attacked by a flock of terns and blackbirds. All seemed to be nesting in the area;

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2 mi. N. of Alturas, 4370 ft., Modoc Co., Calif.

June 14 (cont'd.). Most of the Yellow-heads were carrying food. Circling over the marsh were Barn and Violet-green Swallows, and Killdeer.

I forgot to mention that, on the Crowder Flat road, about 10 mi. NNW of Alturas, I saw 2 pairs of California Quail.

2 mi. ~~SW~~ W. of Alturas, 4370 ft., Modoc Co., Calif.

June 15 - Under the bridge at Rattlesnake Creek is a good colony of Cliff Swallows. I could not collect as there were houses near and many cars on the road.

17 mi. NNW of Alturas, 1 ft., Modoc Co., Calif.

At this point on the road I saw a pair of Scrub Jays and collected one. It is in worn plumage. The road to Crowder Flat is almost all Juniper and Sage country.

30 mi. NNW of Alturas, ft., Modoc Co., Calif.

Here I came upon a good-sized flock of Piñon Jays - at least 30 - working through the Junipers, calling constantly. There were many young birds in the flock; I collected three. A little farther on I noticed Vesper Sparrows for the first time.

33 mi. NNW of Alturas, ft., Modoc Co., Calif.

There is a big marsh here, and I hoped to collect a willet but none were at all close although I did see some. Also present were Brewer, Yellow-headed and Red-winged Blackbirds, Wilson Phalaropes, Mallards, Black terns, Killdeer. Circling in the distance at great height was a flock of white Pelicans - about 25.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

June 15 (cont'd.) Near nest #7, above the meadow on a lava rock - juniper + pine plateau, I flushed a Nighthawk from its "nest," which contained one egg. I will go back and collect the bird tomorrow. I also noted a ♂ Western Tanager scratching its auricular region in a very agile manner - it raised its right foot up medial to its right wing and scratched.

June 16 - Up at 5:10 A.M. - Weather still clear, warm. Malcolm Nobs and Ed McMillan from the Botany Dept. ^{U.C.} are up here collecting marsh flora, and I went out with them to 33 mi. NNW of Alturas, ft., Modoc Co., Calif.

which is a big marsh out in the Juniper-Sage flats. Here I collected two Willets, and saw numerous Black Terns, a few Cinnamon Teal, lots of Mallards, Brewer and Yellow-headed Blackbirds, Killdeer, Wilson Phalaropes. In the sage I scared out a doe and then came upon a tiny fawn no bigger than a jack-rabbit which staggered away at my approach. I doubt if it was more than a day old. Also in the sage I noted Horned Larks in song, and Sage Thrashers and Vesper Sparrows. Two Turkey Vultures which flew over the marsh were hotly pursued by the Terns. Violet-green Swallows flew over, and Red-wings were present in the marsh. There were lots of coyote droppings along the shore.

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June 16 (cont'd.) I feel sure the Willets are nesting in the area, although the gonads of the pair I collected were not enlarged. They become very agitated at the presence of an intruder, which is usual, but they seem to be paired off. They occur in almost all the marshes of any size in the vicinity.

I find that this marsh is called Dry Valley Reservoir on the Forest Service map. It is just about 5 mi. S. of Crowder Flat, on the ~~east~~ west side of the road.

June 17 In the morning, on the rocky flat above sapsucker nest #7, I flushed a ♀ Nighthawk which fluttered away with its tail drooping and lit on a low branch with its wings dangling limply. This seemed to be an obvious diversionary action, for when I shot at it with the .410 it flew away strongly and lit up in a pine nearby, where I got her with the 16 ga. I then went to the Nighthawk nest mentioned on June 15 and shot at the ♀ on the eggs, and she flew away strongly. I have doubts about the efficacy of the .410. In the afternoon I returned and shot her at closer range, breaking a wing. She was very aggressive as I came up, trying to fly at my hand with her mouth gaping and hissing loudly. I decided to leave the eggs and try to get the ♂ if he should come to incubate.

June 18 - Rain. I got out briefly to nest

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June 18 (cont'd.) - #3, and noticed well-grown young Hairy Woodpeckers flying about. In the afternoon I went to the Janes Reservoir about 2 mi. S. of here for a short time; here was a family of Pygmy Nuthatches, the young well-grown, and a very aggressive White-headed Woodpecker that followed me all about with a great deal of noise.

June 19 - It has been raining all night and most of the morning. By noon the clouds broke somewhat and there was intermittent sun until about 3:30 when the rain clouds closed in again. Out at the meadow through which Willow Creek runs, called "Upper place" on maps of the area, I saw a flock of about 10 White Pelicans circling very low as if they had come up from the meadow or were settling into it. There is lots of water in this meadow, but only a little is open.

I went by the Nighthawk nest at which I collected a ♀ and the eggs were still there, cold. Apparently the ♂ has no share in incubation.

June 20 - 3:30 A.M. Robins singing, a few Poor-will calls until 3:50 - skies fairly light. Then the Juncos and Doves start, and next the Chickadees. At about 4:00 A.M., jays were calling and then Empidonax Flycatchers, which call "chwip-creek!"

Thin clouds remained all morning and in the afternoon they became heavy. After 3:00 P.M. there were occasional light showers.

In the past few days I have noticed several young bucks with knobbed "spikes" about 6 in.

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June 20, (cont'd.) long. They are as unwary as the does. This afternoon there has been a porcupine in a small juniper outside the ranger station, feeding at a very slow pace.

The Carpodacus finches mentioned in the Journal are all Cassin Finches, I believe. The ♀s and young ♂s have finer and more sharply edged streaks than Purples, and I finally collected a singing ♂ cassini to make sure. I saw a young, streaked-plumaged ♂ in the top of the half-dead pine in which nest #10 is located singing and fluttering his wings as though begging. I presume it was an imm. ♂ and not a ♀ as it was singing.

There are many broods of young Robins out all through the woods

June 21 - At nest #3 at about 3:45 A.M. Robins were singing at 3:30, but I could not determine any sequence after that. Conspicuous, though, from 3:45 on were the songs of House Wrens, sometimes given on the wing, calls of Pewees, and the mewing of the Green-tailed Towhees. The sky was mostly overcast before dawn, clearing considerably by around 7:00 A.M. At about 6:00 I heard and saw several Brown Creepers singing, and collected one. No Poor-Wills heard.

Near nest #6 I scared up a young spotted fawn which bounded off; this is the 2nd spotted one I have seen.

The weather cleared rapidly and from 9:00 A.M. on there were no clouds in the sky. There was some wind in the afternoon and evening.

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June 22 - Up at 3:00 A.M. again. When I got to nest #1 at 3:45, there was such a welter of songs and calls that I could not tell which came first. The weather dawned perfectly clear, quite cold before sun-up.

By 8:00 some cumulus clouds started to come from the west, increasing by mid-morning. At about 8:00 at #1 a family of white-breasted Nuthatches came around; the immatures were less bright on the back, their black caps were dull, not glossy, and they had a slightly fuzzy look about them.

On the way to the nest, while still dark, I have passed what I think are Dipodomys in the road. I see them only an instant in the headlight glare, but they seem to hop instead of just running; I can't tell about the tail. Of the other rodents, half-grown young of both kinds of ground squirrels and chipmunks are abundant.

Afternoon mostly clear, occasional cumulus. 4 White Pelicans circled over Upper Place in the early afternoon.
June 23 - weather all clear, windy in afternoon. Nothing too unusual in the way of birds except the sapsuckers. The Empidonax nest mentioned in a previous note still has 4 eggs in it, unhatched. This seems slow. In the afternoon, between nests #3 and #7, I scared up one little fawn and then another a few yards farther on. Both bounded away about 10 yds and then stood still, looking at me until I moved again, when they bounded off as best they could on the rocky ground. I saw several Sylvilagus rabbits today also.

June 24 - to Alturas for supplies. See ^{sp account} ~~Journal~~ for birds.

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Crowder Flat, 5200 ft., 38 mi NNW of Alturas, Modoc Co., Calif.

June 25 - Weather clear, warm all day. At the Bluebird nest by Saps. nest #3, I noticed a commotion and saw a Chickaree pulling nest material out of the Bluebird nest hole. It looked as though the nest were half out. The squirrel made several visits, and all the while the birds were very agitated, cheeping and popping their bills rapidly. The squirrel was silent, and seemed undisturbed by them. I could not tell what happened to the young Bluebirds, assuming that they had been in the nest.

7:30 P.M. - at nest #3. While I sat quietly in plain sight, a doe came up to within 6 ft behind me. I heard steps and turned; both of us were a bit startled, and the doe bounded off about 15 yds and stopped, looking back curiously. Then she went down to the meadow and finally across it into the pines. In this time she made what I can only call a "snuffing" sound, not a hiss, not a snort, but more like the former. It is clearly audible for 75 yds.

In the northwest there is a lot of heat lightning and thunder, — clear elsewhere.

June 26 - 3:30 A.M. Robins and Pewees calling, joined by Empidonax flycatchers a few minutes later. The Chipping Sparrows began singing about 3:45, and the Warbling Vireos not until after 4:00.

In the late afternoon, in the meadow by the ranger station there were 2 young bucks - one with a pr. of two-point antlers, growing, the other with just elongated knobs. I have noted, by the way, that deer go under barbed-wire fences when they come to them.

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Crowder Flat, 5200 ft. 38 mi. NNW of Alturas, Modoc Co., Calif.

June 27 - Weather clear, quite warm all day. Nothing special in the way of birds other than sapsuckers. The House Wrens just below #6 are feeding their young at a furious rate - at least every 2 minutes, probably more often - but wrens are still singing. Red-tailed Hawks continue to scream at anyone in the area; I have not seen young hawks out yet.

June 28 - 3:30 A.M. Robins and Pewees noisy, then Empidonax flycatchers, and Chipping Sparrows by 3:40. Weather clear before sun up, clouds (stratus, I think) appearing shortly after. At about 4:30 I saw a Cormorant (P. auritus) fly over in an easterly direction, and about 20 min. later two more, also to E. The latter were definitely adults. At 5:30 it is still extremely cold, at least it feels so to me.

June 29 - Clear until late afternoon; numbing cold until sun well up. Concentrating on sapsuckers. At 11:30 I saw my first Hummer in this area. It was feeding at an Indian Paint-brush (or a close relative of it) with its back to me, and it flew away before I could identify it. The back was all green, and the size of the bird was smaller than an Anna's. It could have been and probably was a Calliope, but it looked a little large for one.

On the rocky flat, or rather slope, between nests #6 and #11 I noticed several Blue-tailed Skinks (Eumeces), on and going under the rocks. Scorpions are common all over.

June 30 - weather clear, warm, usual winds. Young Tree Swallows and Flickers were conspicuously out today.

July 1 - Weather clear, quite cold in early morning

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July 1 (cont'd), hot in afternoon. I did not see anything unusual ~~as~~ regards the birds other than sapsuckers, which kept me busy. The House Wren at #6 continues to attack the saps. (see sp. account) and d. n seems much more afraid than d. This may easily be a sex difference in behavior.

At Twin Spring I found a Western Tanager nest about 15 ft up in the crotch of a small branch of a big yellow pine. Both ♂ and ♀ were close by.

July 2 - Weather clear warm. Too busy with sapsuckers.

July 3 - same; I did notice a Solitary Vireo feeding its young, another Hummer was seen briefly by #6, and also there was a Fox Sparrow near #6, only the 2nd one I have seen.

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Thousand Palm Canyon, Riverside Co., Calif.

Jan. 25 - Awoke at dawn here - very cold, about 0°C , clear, windy. Only one bird seen, a say Phoebe. We drove on past the Salton Sea towards Calipatria, passing through Indio along the way. At the Salton Sea we noted many Ring-billed Gulls, Ruddy Ducks, and Eared Grebes. something seems to be killing the Grebes, as we found 12 in varying stages of decay along a couple of hundred yards of shore, and no other dead birds except one gull. A flock of Sage Sparrows was seen at this spot. Near Indio we saw Verdins, Phainopeplas, Cactus Wrens, Mockingbirds, Western Blue-gray Gnatcatchers, Shrikes, Meadowlarks.

At Mullet Island, at the south end of the Salton Sea were about 1500 Pintails, hundreds of Ruddy Ducks, a few Canvasbacks, Coots, Eared Grebes (more dead on the shore) Snowy and American Egrets, Greater Yellow-legs, Willets, Killdeer, Least (?Western) Sandpipers, Avocets, a Marsh Hawk, many Ring-billed Gulls, Great Blue Heron, Say and Black Phoebe, White-crowned Sparrows, Dowitchers.

We drove on towards Calipatria, Imperial Co., and in the wet fields of alfalfa we noted a great many Ring-billed Gulls, Long-billed Curlews and Killdeer, and in one field

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Near Calipatria, - 180 ft., Imperial Co., Calif.

Jan. 25 (cont'd.) by themselves were 3 Mountain Plover. Tree Swallows passed overhead.

We reached a camp site about 3 mi S. of Calipatria in the late afternoon, noting Cactus Wrens, Phainopeplas, and Abert Towhees in the vicinity. This locality is on a State Game Refuge, and a large Tule marsh is close by. At dusk large flocks of ducks, mostly Baldpates, and white-faced Glossy Ibis came to settle in the marsh. ^{Bl.-crowned} Nt. Herons too.

Jan 26 - clear, sub-freezing temperature.

Cactus Wrens singing, Verdins, Phainopeplas, Blue-gray Gnatcatchers, Abert Towhees active, Red-shafted Flicker calling. At mid-morning we worked through a good deal of mesquite and brush and down along the cottonwoods, willows and tules along the nearby stream without finding anything new. Returning to the campsite and crossing the river, we noted ("we", in all cases so far, means Wm. Dawson, Stuart Landry, and myself) Say and Black Phoebe, Red-wings, Mockingbirds, Sage Sparrows, white-crowned sparrows, Sparrow Hawk, Red-tailed Hawk (very dark) and Turkey Vulture in addition to the species already mentioned.

In the afternoon a survey of the nearby flooded fields showed lots of Ring-billed Gulls, Long-billed Curlews, one Hudsonian Curlew, some Greater Yellow-legs, Least Sandpipers, Killdeer,

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3 mi. S. Calipatria, - 180 ft., Imperial Co., Calif.

Jan 26 ^{cont'd.}

and White-faced Glossy Ibis - no Mt. Plover.

A survey of the ponds near the road revealed Baldpates, Shovellers, Coots, and one Black Gallinule seen crossing the road.

Also, Road-runners were seen in the brush and fields. I did not see any Gila Woodpeckers, but Dawson did. ^{Orange-crowned Warblers,} Ruby-crowned Kinglets seen.

At dusk a flock of about 26 Yellow-headed Blackbirds, ♂s and ♀s, was seen passing over toward the west. The ducks, ibis, and herons mentioned on previous pages were also seen, and quite a few Black-crowned Night Herons were seen and heard.

Jan 27 - clear, very cold, sub-freezing, at dawn. Cactus Wren, Phainopepla, Verdin, Say Phoebe, Blue-gray Gnatcatcher conspicuous around camp. All the birds noted yesterday were seen again today, and in addition we saw one Crissal Thrasher, one Sage Thrasher, and a few Yellow-throats. By the flooded fields we saw one Burrowing Owl, and in the fields at least 9 Mountain Plover and one Lesser Yellow-legs in addition to the gulls, ibis, herons and shore birds of yesterday, but no Hudsonian Curlew. At dusk, a flock of Yellow-headed Blackbirds was seen heading east. We heard a Horned Owl, and another, unidentified owl (long-eared?) at night.

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3 mi. S. Calipatria, -180 ft., Imperial Co., Calif.

Jan 28 - Mr. Bill Anderson of the State Game Refuge here took us on a tour of the refuge and then out to the edge of the Salton Sea near its southern tip. ^{10 mi. NW Calipatria} On the refuge we saw Baldpate, Pintail, Shovellers, Green-winged Teal, Coots, 2 Sora Rails, Dowitchers, Least Sandpipers. One song sparrow was seen, not saltonis, but with a large bill, large enough for Passerculus s. rostratus, which it was not. Possibly fisherella? The hawks, road-runners, and passerines of previous days were seen except for the 2 thrashers, and the Yellow-headed blackbirds.

At the Sea we saw a number of Herring and Ring-billed Gulls (also Herrings in the wet fields, where Anderson says he often sees them), Baldpates, Shovellers, Green-winged Teal, 1 or 2 Cinnamon Teal, Ruddy Ducks, Coots, Dowitchers, Greater Yellow-legs, about 5 Black-necked Stilts, Least Sandpipers, Killdeer. On the salt flats we noted 2 Horned Larks, and in the succulent Allenrothia a few Large-billed sparrows, one collected.

In the fields and brush about a mile or two back from the Sea, we saw Gambel Quail, one Pigeon Hawk, Brewer Blackbirds and Cowbirds, Savanna, Vesper, Lark, and White-crowned sparrows, Tule Wrens, a Sage Sparrow. Back at the campsite, Dawson had a Lincoln Sparrow in one of his live traps.

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Journal

Santa Catalina I., Los Angeles Co., Calif.

April 1. We left from San Pedro on the Calif. Fish and Game boat Bluefin, and immediately encountered heavy fog which reduced visibility to almost nothing. On the way to the island, we saw only a few Western Gulls. At the isthmus of Catalina, the fog was still heavy, and only the ~~same~~ Western Gulls and a few Brandt Cormorants appeared. On going ashore, we saw quite a few California Quail in a dry gully in and around which oaks and chaparral were growing. The island was very green, apparently due to recent rains. A few Vermivora celata were heard singing, and one was seen at close range. Two Ground Squirrels were noted; compared to the mainland forms, these seemed larger and darker brown. One squirrel was in the top of a small oak. Ravens were about on the cliffs, and two Horned Larks were seen on an open expanse of dry ground. By mid-afternoon the fog had lifted, and on the way back we saw two adult Bald Eagles high up on the island. Not a single Alcid or Procellariiform bird was seen, although eagerly looked for; no pinnipeds, either.

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3 mi. S. of Calipatria, -180 ft., Imperial Co., Calif.

April 6. - I visited the Game Refuge here briefly between 12:30 and 1:15 P.M. The weather was clear and hot. In the pond near the headquarters I saw a few coots and two Black-necked Stilts. Red-wings were very conspicuous, especially singing, displaying males. Two Western Kingbirds were nearby and noisy.

In a clump of willows along a ditch I saw Pileolated Warblers (2-3), Audubon Warblers (many — spring plumage), Orange-crowned Warbler (1), Bullock Oriole (1 ♂), Gila Woodpecker (at least 1 ♀), White-crowned Sparrow (numerous), Mourning Dove (several pairs), Western Flycatchers (presumably — several), and a number of Abert Towhees.

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Species Accounts

Birds

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Sphyrapicus varius daggetti

8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.

May 20 - I first saw a sapsucker at about 8:00 A.M., when one flew overhead and alighted on a dead yellow pine stub about 30 ft high. There were two woodpecker holes in the stub near the top, and this bird hitched up and looked into one, then moved out on a dead branch, perched cross-wise for a moment, and flew off. About an hour later I returned to the same spot and located another or the same bird on a larger yellow pine stub. I alarmed the bird and it flew to a small (about 30 ft high) live pine which showed much evidence of woodpecker and sapsucker drillings and began to peck at the tree. No sound was uttered by the bird until I shot it, when it screeched weakly.

There are no aspens within 2 or 3 miles of this locality, and at this date none show any signs of budding out. Perhaps what sapsuckers there are here are working around the dead pine stubs and other pine trees until the deciduous ones start to leaf out and the weather warms up enough for insects other than wood-boring grubs. The weather is still quite cold here, with an inch or so of snow on the ground in many places.

May 21 - In the same locality that I collected the sapsucker yesterday

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Sphyrapicus varius daggetti

8 mi. N. and 13 mi. W. of Canby, 4700ft., Modoc Co., Calif.

May 21 (cont'd.) - I encountered another one. It showed a preference for the same stub and tree that the other one did, and I suspect that this one is the mate of the collected bird, probably the ♀ (I have not yet sexed the first bird). This sapsucker was noisy and seemed annoyed at my presence; it flew from one dead stub to another, hitching up to the very top and occasionally perching cross-wise on a projecting limb, all the time uttering a nasal, whining call note. When it reached the top of one tree it would fly to another ~~and~~ and start up again. I shot at the bird and either missed it or didn't hurt it much as it flew away strongly giving its nasal cry.

I had several good looks at the bird and it seemed to be a typical daggetti with a completely red head.

In this same area I have noted at least two Williamson Sapsuckers, several Red-shafted Flickers and one white-headed Woodpecker.

Later in the day I visited the same spot and saw what I presume was the same Red-breasted Sapsucker, in good health. Its actions were just as described above, but it seemed more wary.

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8 mi. N. and 13 mi. W. of Canby, 4700 ft. Modoc Co., Calif.

May 22- The day dawned completely clear and not very cold — at least above 32°F. I spent from 8:00 to 11:00 (both A.M.) in the same place described previously in this species account. I located one sapsucker by its scream (it is too loud to be just a "note"), ^{and} saw it hitch up to the top of a dead tree and then fly off.

Shortly afterward I heard and saw one drumming on a small branch in the top of another dead tree. [The drumming goes essentially like this: B-r-r-r-r-rap-rap, rap-rap-rap. There is some variation, of course, but unless otherwise noted, "drumming" will refer to this or a very similar sound.] This drumming was repeated once or twice, and then was answered by another bird in a ~~dead~~ dead tree about 20 yds away. The drumming and replying went on several times, and then a third sapsucker screamed from about 50-75 yds away. One of the birds I was watching flew off, and was followed by the other. Then drumming recommenced about 100 yds away. When I caught sight of them again, all three birds were together and went off chasing each other about through the trees, screaming intermittently. Once I got a glimpse of the three in a dead tree; one was perched lengthwise on a limb, and was bobbing



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8 mi. N. and 13 mi. W. of Canby, 4700 ft., Modoc Co., Calif.

May 22 (cont'd) its head and body up and down and raising its crown feathers slightly. The other two approached this one (or each other) from either end and then all three flew off again. All the rest of the morning I heard screaming and drumming. I watched one bird pursue another around through the trees seemingly with mating rather than mayhem on its mind, since they flew about in the same area without any apparent attempt on the part of the pursuer to drive the other away from the region.

The small tree in which I collected the first sapsucker seems to be a favored one for feeding; it is a pine about 10 inches in diameter near the base and about 20 ft high. There was a series of fresh workings on the trunk about 10 ft. up, and I came up close (30 ft.) and watched. A moment later a sapsucker alighted in this spot and began picking at the freshly opened holes in the bark. This bird was not typical daggetti as it had a dark auricular patch showing through the red and a definite white ~~superciliary~~ post-ocular stripe. Then it began pecking another hole just above the top one in a series.

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8 mi. N. and 13 mi W. of Canby, 4700ft., Modoc Co., Calif.

May 22 (cont'd.) - Then another sapsucker screamed several times and this bird (call it bird A) flew off. 15 minutes later I heard a few screams (they vary from 1 to 6 in succession) and a moment later bird A ^(or another similarly colored) returned to the feeding spot. It was immediately followed into the tree by two others. Then two of the three now in the tree flew, including the presumed bird A. The one remaining was a typical daggetti, and it picked about the holes, including the one bird A had freshly dug, for about a minute and then flew away. 5 minutes later the presumed bird A returned and began to peck a new hole above the last one; then it screamed 6 times and departed. 10 minutes later I heard several screams, and ~~a~~ a typical daggetti flew in and picked at the holes. I could see it swallow but could not tell what was being swallowed. This bird then began pecking another hole to the left of those of bird A. The holes are apparently through the bark and are filled with fluid.

Unfortunately I cannot sex these birds without collecting them. I am not sure whether the drumming procedure is a declaration of territory or part of a

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May 22 (cont'd.) courtship process. of the three I have under observation, one is daggetti > nuchalis, one is typical daggetti, and the other I am reasonably sure is typical daggetti, but I have not seen all three together at close enough range to be sure. Perhaps the bird I collected on the 20th was one of two pairs.

At 2:00 P.M. I returned to the same spot. About half-way there I heard a Sapsucker ~~drumming~~ drumming on a tough, dried-up dead stub which gave the drumming some resonance. I shot at it but it flew off, injured or not.

When I reached the favored site there was bird A, the one with nuchalis leanings, on the same large yellow pine stub on ~~which~~ which the collected sapsucker was first observed. It hopped up to a hole (one of at least 5) about ~~to~~ 60 ft. off the ground, poked its head and then most of its body in and began pecking. This went on for a minute or so; then the bird withdrew and began to ruffle and preen its feathers, occasionally scratching its ear region with one foot. A moment later it flew away.

About 7 minutes later, a bird which

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May 22 (cont'd.) I shall call bird B, a typical daggetti, alighted near the same hole that a bird A had investigated. Bird B went through a similar preening process, tapped the tree trunk a few times, looked in the hole, hitched higher up the trunk, and flew away. About 10 minutes later bird A arrived again, alighting near the hole. It hitched about the trunk in the region of the hole and then screamed 8 times. No reply. It screamed again 6 times, and was answered by screams from 100 yds or so away.

Bird A then flew to the small yellow pine in which this morning's feeding observations were made and began to feed.

10 minutes later Bird B arrived in the dead yellow pine, near the hole.

It drummed once, tapped around a little, and departed. 5 minutes later Bird A alighted at the hole and did some more of what I presume to be excavating. A few minutes later bird

B arrived on the trunk close to A;

A noticed him ~~was~~ and flew down to the small yellow pine with a stuttering cry, apparently undalarmed, and began to feed. Bird B excavated a little and left, to be replaced a minute or

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May 22 (cont'd.) so later. Bird A stayed for 10 minutes, excavating occasionally. Bird B came in about 5 minutes after A left, stayed 15 minutes and did quite a bit of excavating and occasional preening. Then B left and so did I.

My guess is that these two are a mated pair excavating a nesting hole in the dead yellow pine tree. Their head patterns are different enough so that I can tell them apart easily, and there is no question but that they alternated at the presumed nesting site as described above.

May 23 - same place. I was at the grove at about 6:50 A.M. Weather clear, cool; the sun shone brightly on the entire side of the dead tree in which the suspected nesting hole is located. At 7:05 a Flicker alighted on the tree about half way up the trunk, topped a few times and flew away. This made me reasonably sure that nothing was in the hole or the tapping and scratching would have scared it out.

At 7:20 I heard drumming, and again two minutes later. At 7:26 Bird B arrived at the dead tree, perched cross-wise on a short branch, hopped to the trunk, tapped a couple of times, investigated the hole,

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May 23 (cont'd) - drew back, and began to preen.
At 7:35 some other bird (probably a Hairy or a Flicker) beat out a short, regular tattoo from a short distance away. Bird B had hitched higher up on the trunk where the resonance is better, and drummed once, possibly in response to the tattoo. Then B began more preening, and scratched its head with its right foot.
7:37: B drummed again; again a tattoo in the distance; B gave a short drum, and began to hitch up to the very top of the dead tree. 7:41 - B flew off.

At 8:05 B alighted on the trunk, tapped, went to the hole, investigated it, screamed 5 times, tapped the trunk some more, and left at 8:07.5. A moment later I heard it give 5 screams from another dead tree. At 8:10 a bird drummed nearby.

At 8:27 Bird A alighted near the hole, went about half way in for a few moments and withdrew. "A" screamed 5 times, began to preen and scratch, screamed 7 times, preened some more, and then hitched up to another hole about 18 inches above the suspected nesting hole. Bird A poked itself about halfway in, withdrew, cocked its head on one side and then the other (listening?) and stuck its head back in. It withdrew, screamed 6 times, tapped the trunk,

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May 23 (cont'd.) screamed 7 times and left at 8:32 A.M.

I returned to the area about 2:45 P.M. At 2:55, Bird B came to the hole, looked in, and left. Not until 4:20 did another Sapsucker appear — this time Bird A, which was collected at the hole. I waited until 5:00, but Bird B did not appear.

From 6:45 P.M. to 8:00 P.M. I watched the tree but Bird B did not appear. I heard several series of screams nearby but did not see any sapsuckers.

- May 24 Returned to area at 6:50 A.M. Heard quite a bit of drumming but could not be absolutely sure whether it was one bird or two, but I think two. At 7:15 the presumed Bird B alighted on the dead tree above the hole and began to drum in the same spot I had seen B drum before. The bird flew a moment later. I heard sporadic drumming nearby; at 7:35 there was a series of screams and B alighted at the drumming spot and drummed. I shot the bird, which proved to be a ♂. I can't be absolutely sure, but I think TRH No.'s 351 and 352 were a mated pair.

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38 mi NNW of Alturas
Twin Spring, ft, $\frac{3}{4}$ mi. of Crowder Flat,
May 21 Modoc Co., California

I located my first sapsucker in an aspen about $\frac{1}{4}$ mi W. of Twin Spring. It was a daggetti with nuchalis tendencies - black on auriculars + back of crown. It did not seem shy and soon popped into a hole in a dead aspen. The hole, one of many, is about 5 ft off the ground. This was at about 8:15 A.M.

10:00 A.M. Found a pair in a clump of about 6 aspens along Willow Creek $\frac{1}{2}$ mi E of Twin Spring. One bird is typical daggetti, the other just about intermediate. Both flew from the aspens to small pines a few feet away, but as I stood quietly they both returned and immediately began to scream. Then the daggetti mounted the other, and although my vision was slightly obscured by branches, I believe a copulation took place. I noticed considerable fluttering of wings. A few moments later the daggetti (σ) again attempted to mount, approaching the ♀ along a branch with outstretched neck and fluttering wings, but she flew off. He then descended to a hole in an aspen (about 1 ft in diameter) only $2\frac{1}{2}$ ft. off the ground. He paused a few inches to the left

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38 mi NNW of Alturas
Twin Springs, _____ ft., $\frac{3}{4}$ mi of Crowder Flat,
Modoc Co., Calif.

May 21 (cont'd) of the hole and then shifted over to it. For 10 minutes he stayed in this position, looking around at me and occasionally bobbing his head into the hole but not going all the way in. Then the female alighted higher up on the tree and he popped in. After that, I went to look for other nests (see Journal). The observation was concluded at 10:30 A.M.

In the afternoon I went to the Crowder Flat Ranger Station where there are some nice aspens. I saw lots of workings but only one s'sucker, a daggetti

I returned to Twin Spring at 4:00 P.M. and at 5:00 ^{P.M.} went out to nest No. 1 (1st described on previous page) and looked in with mirror and flashlight. I saw no eggs but was not sure that I could see the bottom of the nest. About half-way back to Twin Spring I saw a perfect typical daggetti working (feeding, I believe) in an aspen. It seemed a little nervous, and screamed once before resuming its workings. Then it flew over to a large yellow pine, screamed twice, and then six times. After this it flew off out of sight.

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Twin Springs, _____ ft., 38 mi. NNW of Alturas,
Modoc Co., Calif.

May 22, Walked down to Saps nest #2 at the Willow Creek meadow, arriving at about 5:15 A.M. It was light, but the sun was not out. At 5:30, heard a Saps. "tattoo" (= b-r-r-r-r-r-r-rap-rap, or approximately that), apparently from a big yellow pine about 100 yds from the nest. 5:35: Another tattoo, 50 yds. away. 5:40. One of the pair was in the nesting hole; I tapped on the tree and got a response of a few squawks. The bird looked out but did not fly away. 5:50 - The first sun. 6:00 - another tattoo near nest #2. I went off looking for others. At 7:20 I located another pair in the aspens about 1/2 mi. from #1, but along the same creek. Both birds are typical daggetti, and their nesting hole is about 7 ft. up. I heard two tattoos, and both birds flew. 5 screams followed. One bird - the presumed ♀, returned to a small vertical limb by the hole. Tattoo in distance, ♀ answers with squawks. 3 more tattoos from "♂" (?), unorganized tapping by ♀. She scratches her ear region with the left foot, then the opposite with her right. Preens.

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Twin Spring — — ft., 38 m NNW of Alturas,
Modoc Co., Calif.

May 22, (cont'd). Flies to hole. screams
70 times at about 1 sec. intervals —
there is an answering scream, and
she screams twice more. The ♂ returns,
both squawk. ♂ leaves again. All
the while a pair of house wrens has
been busy singing and scolding about
7 ft higher up in the same tree — they
ignore each other. A chestnut-backed
Bluebird chases both, however. ♀ to
hole — looks in — away — then into hole.
7:35 — 3 tattoos; ♀ looks out of hole,
comes out. Squawks. Another tattoo — ♀
flies off toward it, to the pines 50 yds
away. More tattoos. Returns to hole,
goes in. Head out — all out. From away,
7 screams. Other returns — much squawking.
♂ away. 4 screams, 8 screams; ♀ squawks,
flies away. 7:50 — ♀ returns; squawks,
distant tattoo, answering squawks. To
hole — tattoo from away — in hole. Another
tattoo. 7:52 More tattoos. 7:56 ♂
returns silently, leaves. Nothing from hole.
♂ returns — another (3rd) follows, driven
off by "♂." ♀ out of hole, then both go
off pursuing 3rd. ♀ returns 7:58, ♂ returns;
squawking — both leave. ♀ returns — preens,
shakes, scratches; squawks twice as

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Twin Spring — ft., 38 mi NNW of Alturas,
Modoc Co., Calif.

May 22^(cont'd) Juncos fly close by. To hole, in
slowly (8:03).

(Tattoos of varying loudness were among
those heard previously — possibly by two
♂s, or at least two birds).

8:04 — 6 tattoos, approx. 20 sec. interval.

♂ returns — both squawk — ♀ out of hole;

♂ to another tree close by, immediately
chased by a pr. of Bluebirds, flies away.

♀ goes in hole. 8:09 — head out of hole.

Distant ~~to~~ (50-100 yds.) steady roll of
Hairy is heard — ignored. 8:17 — out
of hole. 8:20 back in, out of sight.

8:24 Head out, then all out, Away.

8:25 ♀ Returns. Squawks. Tattoo heard,

closer tattoo. 8:27 ♀ goes in hole. 3

distant screams. ♂ returns, much squawking

by both. ♂ away. ♀ out of hole, preens;

back in hole, 8:29.

8:30 Carved "III" (for 3) on tree trunk —
no response. Tapped twice, trying to simulate
tattoo — bird looked out, then flew out
Screamed 3 times, squawked. ♂ returned,
tattooed loudly close by. I left.

(For convenience in writing, I have assumed
that the ♀ is the bird in and out of the
hole. It may or may not be the same
bird every time; don't take sex signs literally)

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Twin Spring, _____ ft., 38 mi NNW of Alturas,
Modoc Co., Calif.

May 22 (cont'd.) 2:40 P.M. Returned to nest #2. The typical daggetti (♂?) was in the hole. It looked out, then flew out a few feet away and scolded me. I looked in with mirror and flashlight and saw three eggs, which is I believe, possibly a full clutch. I left immediately. About 100 yds away I heard a Saps. scream and looked up to see one high up in a big yellow pine stub. It moved from branch to branch and then flew out of sight. The background was poor but the bird showed a lot of white spotting; possibly it was the mate of the nest #2 bird, which shows strong nuchalis color trends.

At 3:45 P.M. I went to nest #1, which is about 5 ft up in a dead aspen. A bird flushed from the hole, and it was one I had not seen before — ~~not~~ nuchalis with tendencies toward daggetti. The other, the one I had seen, is daggetti with fairly well-marked nuchalis tendencies. I could not find any eggs after a diligent search with the mirror, and I am fairly sure I saw the bottom.

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Twin Spring — . ft., 38 mi NNW of Alturas,
Modoc Co., Calif.

May 22 (cont'd). Both birds remained close by as I examined the nest cavity. This, nest #1, is about $\frac{1}{3}$ of a mile from nest #3, occupied by two typical daggetti.

May 23. Arrived at Crowder Flat at 5:30 A.M. and looked around the aspen grove by the ranger station. Two Hairys were very noisy there, drumming and kyip!ing to each other. At the same spot I saw a Saps., mostly daggetti if not typical. It tapped idly in the aspens and in an adjacent yellow pine, and then squawked several times. I could not tell if there were answering intermingled squawks, but I don't think so. A Brewer Blackbird was squawking in an aspen close by — perhaps the saps. mistook it. Several possible nesting holes nearby.

5:50 — 2 birds now — 1 typical daggetti. They pursue each other for short flights and hitches round + round the aspens, always alighting low — usually less than 4½-5 ft. Much squawking, occasional tut-tutts, I think by both birds. Once they scuffled bill to bill in mid-air for a few seconds, about 4 ft. up, then plopped into the grass.

6:05 ~~A~~ One of the 2 flies up in

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Crowder Flat, 5200 ft., 38 mi. NNW of
Alturas, Modoc Co. Calif.

May 23 yellow pine a few feet above me
and squawks several times. A
3rd daggetti appears, perches x-wise,
and is mounted — passive, probably un-
successful. Now follows more tree to
tree stuff, squawking + tapping. The
other bird, left behind, tattoos a few
times. One of this pair does much
tapping in a small juniper. The other
goes to a hole in an aspen 3 ft off the
ground, hangs about it, taps around,
looks in several times. Continued taps
by both. "outsider" heard screaming
in near distance. Bird which looked
in hole now tattoos — it is away from
the "nest" hole. Robins and B. Blk birds
are noisily about + ignored.

"Juniper" bird goes to hole, hitches above
it, taps. Back to the juniper. Flies
off to yellow pine 30 ft away. 6:25.
All perching has been low — less than 5 ft.
6:30 — Back at juniper (one bird). 2 tattoos
heard from other. Both nearby — tapping +
squawking. One near hole, other perches
half way up yellow pine. one back at
juniper — now over to aspens 50 ft away.
No further activity; no eggs that I could
see in cavity.

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S. v. daggetti

Crowder Flat, 5200 ft. 38 mi NNW of Alturas,
Modoc Co., Calif.

May 23 (cont'd.) About $\frac{1}{4}$ mi. south of the ranger station, at 7:10, I came upon a daggetti busy excavating a hole in an aspen about $2\frac{1}{2}$ ft. above ground. In a moment it was joined by another daggetti at the hole. Squawks. The first flew away. The second took a few pecks at the cavity, hitched about near it, tapping, and then flew off in the opposite direction from the first bird, catching an insect on the wing in the process. #5.

I now went to nest #1, arriving at 8:10; no sign of the birds. At 8:25, a bird arrived at the nest - squawks - one emerged from the hole, flew to another tree, tapped. 2nd bird approached hole, looked in several times, entered. other flew off nearby.

8:30. - Much tapping by 2nd bird, probably feeding, about 50 ft from nest. 9:00 - Bird alights in tree near hole, taps. 9:03 - they change places. Relieved bird flies 30 ft away, screams several times.

9:35 - Nuchalis > daggetti (intermediate, about $\frac{3}{4}$ or $\frac{2}{3}$ nuchalis) alights in tree 10 ft away, preens. 9:40 - to hole. Bird in hole out. Other is above, hitches down to hole with about 20 screams, half in several times,

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Crowder Flat, 5200 ft, 38 mi NNW of Alturas,
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May 23 (cont'd.) - screams, off to side, half in twice more - all in, 9:43.

This n>d is the bird I took to be mostly nuchalis yesterday. A better look shows it to have strong daggetti colors. There is a narrow black breast band and some head striping, but most of the breast and head are heavily suffused with red. Mate is typical dggti.

10:30 At Twin Springs, a dggti flew silently from low on a juniper by the shack to high in a big yellow pine.

12:55 Arrived at "nest" #5 (1/4 mi from Ranger Station) for 2 hr. watch. 1:00 - dggti present, not at hole, silent. 1:08 near hole, few soft squawks. 1:30 - One bird excavates new hole, 7 ft up in a nearby aspen, 30 ft from first. There are lots of fresh holes in these trees, some deep, some shallow - they may look for a rotten, soft core. 2:00 - other returns, 1st leaves. 2nd cleans out hole, no tapping. 2:15 - 1st returns, continues tapping, cleaning. 2:40 - 2nd returns, squawks from both. 1st leaves. More excavating. 2:48 - 1st returns - alights above. 1st away from hole. 2:50 - squawks - neither at hole.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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May 24. I heard the first Saps. noise tattoos + screams, at 5:20, A.M. At 5:50 I saw a dgiti (=daggetti) in a juniper on the edge of an aspen grove across ~~for~~ the flat from "nest" #4 (which is ~~now~~ [or was] at the Ranger station). It was silent, and flew off across the meadow.

At 7:25 I reached the area of nest #3 after searching other aspens and a lot of pine woods. I heard a Saps. tattoo on a big dead stub here, but did not see him. I sat down and watched nest #3. At 7:35 I noticed one bird near the hole, apparently feeding. At 7:45, a 2nd bird emerged from the hole, flew over to the first. One of them left. At 7:50 the remaining one went back into the hole. At 7:55 the other bird returned — from a different direction this time. The bird in the hole came out, they exchanged soft squawks, and the other went in. At this time I left. This exchange of places suggest incubation.

At 10:25 I went to nest #5. One was at the hole, silent, resting and preening and scratching (they do this often). At 10:35 I heard soft squawks, and a 2nd

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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May 24 (cont'd.) bird appeared from lower on the tree. 1st bird leaves. 2nd goes right to hole, starts to clean debris out of hole, usually half way in. 10:37 Hitches up the tree about 3ft., then flies to hole - silent - preens and continues cleaning out hole. I did not hear any pecking. 10:42. Bird seems nervous, hitches up 3ft., then back to hole. 10:45 1st bird returns, both squawk. 2nd leaves, 1st goes right to work. 10:50 Bird all the way in except for tip of tail. ~~to~~ 11:02 2nd comes to juniper close by - soft squawks other still busy in the hole. 2nd goes to aspen, alights just above hole, shifts about. No response from 1st. 2nd moves to another tree close by. A Hairy Woodpecker appears near the aspen, and is chased to a yellow pine about 60 ft away by the 2nd bird. Then it goes and chases the Hairy out of the pine. The Hairy shows no resistance, there is no fighting. The saps. is quiet, the Hairy ~~kyip's~~ a few times. The 2nd returns to a nearby aspen, alights for a moment at a hole about 8ft up, flies away. ~~to~~ 11:07. 1st bird still in hole, has taken no notice. 11:10 2nd

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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May 24, (cont'd) bird arrives below hole, squawks. Goes up above hole, down to it — squawks again — 1st stays in. 2nd flies away. 1st comes out, rests. 11:18 2nd flies directly to hole. 1st leaves right away — few squawks exchanged. 2nd goes right to work. Steller jays and Robins calling loudly to (or at) each other are ignored. 11:48 — 1st returns to above hole, hitches down. 2nd leaves. A Red-tailed Hawk soaring over and screaming is ignored. 12:12 2nd returns to hole, other still almost all in. 2nd goes from tree to tree nearby, then away.

At this point I noticed that the first bird, although mostly dgtti, has a few nuchalis color traits — extended white stripe on side of head, a little black on crown. Other is typical daggetti. 12:13 1st bird out of hole; 2nd nearby preening, scratching, shaking. 1st bird leaves hole, flies to the 2nd bird. Both squawk loudly. 1st bird leaves — in a moment the 2nd goes over to the hole. 12:15. I leave.

2:30 P.M. I arrived at nest #1 and the $\frac{3}{4}$ nuchalis — $\frac{1}{4}$ daggetti bird flushed from it, alighting a few feet away and screaming. I used

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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May 24, (ont'd) the mirror more carefully this time and saw 3 eggs in the nest; this was suggested, of course, by the fact that the birds changed places regularly. I left immediately so as not to disturb the birds further.

About $\frac{1}{4}$ of a mile down towards nest #3, or most of the way to no. 3, I heard a saps. scream and saw a daggetti alight low in a yellow pine. As I watched it, it flew from tree to tree in the area, squawking a few times, and finally flew to a hole in an aspen about 4 ft off the ground. After a few minutes of nervous bobbing of its head it finally went in the hole. I walked out of sight to give the bird a few minutes to calm down, and came over to the hole at 3:00 P.M. There were lots of fresh chips on the ground below it, so it must be freshly excavated. As is usual, there are several other holes in the same tree, of varying age. ~~I looked in with~~ I tapped on the tree to flush the bird, but nothing happened. I looked in with the mirror and there was

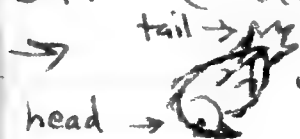
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May 24 (cont'd.) a daggetti on the nest, looking back at me. It seemed a bit cramped, about like this → (top view)



I tapped again and still there was no response, so I decided to leave the bird alone.

This is, then, nest #6. (#4 seems to have been left)

6:30 P.M. Arrived at nest #5. It is still very light but the sun is out of the meadow; the tree tops are still in the sun. No sign of sapsuckers. 7:10 One screams 5 times about 50 yds away. 7:40 It is now fairly dark; Robins are still noisy, but not for long. I tapped on the nest tree but no response.

May 25 Nest #6 - 5:30 P.M. Bird was on tree by hole, flew away silently. There are 5 eggs in this nest, lying in fresh-looking chips - there are freshly excavated chips around the hole, too. The core of the tree is not at all rotten, but cleanly chiseled.

1 { 5:50 P.M. #1 - Bird on nest, will not flush even after repeated tappings and pokings of mirror in hole

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May 26. At nest #5 at 4:00 A.M. — just getting light, sun not up. Flycatchers and Chickadees calling, Robins singing.

4:12 Saps. tattoo from pine 20 yds from nest. 4:13 Again 4:14 — again 4:25 Bird to hole ^{tree} ~~from~~ from where tattoos were heard.

(This bird I call A — it shows slight ruch colors). A to nest hole. 2 tattoo from pine — A back to pine — squawks — one flies across meadow. 4:32 — tattoo from pine (apparently the roost for the present time) — again. 4:33 Bird B, which had flown, is now at a tree near the hole. A now at hole, in except for tail tip. — out.

A preens. 4:52 still there. B returns near hole. Two noisy chickadees are ignored, although near hole. A goes away. B near hole, goes above it, returns, looks in, preens. 5:05 B away to close tree.

5:07 chickaree (squirrel) near hole; 5:08 it looks in — Bird near, no sound.

Bird taps in next tree, with its back to the chickaree. A flies in, direct to hole, possibly not seeing chickaree — soft squawks — squirrel doesn't move, A leaves at once. squirrel washes face with paws — runs up tree — chirps. One bird flies to hole, leaves. Both close

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May 26 (cont'd.) by, one tapping. 5:19 Squirrel to another tree, to ground. 5:22 A (which was tapping) returns to hole, preens. B taps close by - about 30 ft away. B comes closer, squawks. A leaves - B to hole, looks in - half in. 5:32 B goes above hole, down again. Suddenly flies off, then right back. 5:35 B leaves. A near, not at hole. Sun shining in top of tree, not yet on hole. A to hole, looks in - preens; half in, works. 5:48 B comes near, taps. A mostly in hole, Sun now on hole. A leaves. 5:49 B to hole, works. 5:50 B above hole, picks at something, back to hole. Preen, (6:00) works, mostly in hole. Sun now not on hole. 6:07 A returns to hole, squawks, leaves. B continues work. I leave.

10 - 10:30 A.M. I went out to Quaking Asp Spring, which is out in a juniper flat about 10 mi. west of here. No sign of sapsuckers, not a single working.

11:30 A.M. At nest #2. Bird on nest, will not leave. I can see it vertically in the hole, but my taps and thumps ~~have~~ are unsuccessful. I go on past #2 down the Willow creek meadow, through a fence. Here I find a Hairy nest in a dead aspen - the bird has

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May 26 (cont'd.) young, brings them a
beakful of big ants.

About 30 yds farther, I find a small
clump of about 12 aspens, one with
many old and new holes. I started
to poke around in them, and looked
up to see a sapsucker's head sticking
out of one about 10 ft. up. I squeaked
and the bird squeezed out and flew
to a small pine close by and screamed.
It was a typical daggetti. I marked
this #7 and walked on. At 12:10 I
returned. The same bird comes to the
nest, and a typical nuchalis, apparently
a male, emerges, after usual exchange
of soft squawks. 12:18 The daggetti
out, with a gaping beak full of chips,
flies to small pine a few feet away,
tosses them with a shake of the head.

The nuchalis, ^(it turned out to be a ♀) probably a ♂, full red throat
& chin) goes in hole. 12:20. 12:25 - A
white-headed comes into one of the close
pines - d. flies over to him - no sound,
can't see. 12:30 d. to hole - squawks -
n. out - d. in. I leave.

Nest #2 again, 12:45. Typical d. close
by, at level of nest in very small aspen.
Screams slowly 50 times. 12:55 - The

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May 26, (cont'd.) mate returns, alights opposite other bird. Both squawk. I get up and ~~do~~ go to the nest, both fly off. It has 5 eggs in it. I leave at once.

5 With regard to the squirrel incident at nest #5, it seemed to me at the time that the birds were ~~so~~ so unconcerned that it may have been an act — of course this is speculation, but I want to record the impression.

I am very pleased to find a mixed pair — typical daggetti and typical nuchalis. The hairy's are nesting only about 30 yds away, and they do not seem to pay any attention to each other.

4:05 ^{P.M.} Arrived at nest #1. At 4:12, just as the sun shone into the hole, the n>d bird flew out into a nearby pine and screamed several times. I did not see or hear the other bird. There are 5 eggs in the nest — there may have been 5 before — this is a hard one to see in. I left at 4:15.

4:30 — Another nest, #8 — 7 ft up in a aspen, between 1 and 6. Bird flushed as I poked around — daggetti, with a faint touch of n. head striping. 4:35 — Bird returned to nest. 4:42 Bird looks out. 4:49 — Bird again looks out,

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May 26 (cont'd.) comes out to small aspen 10 yds away, tosses chips from bill. Returns, bats in hole 2 ft below chosen one, goes back in nest hole. Hairy feeding young in nest 2 ft high in dead aspen 30 yds away, towards #1. 5:00 - 5:30 P.M. - Occasional

faint tapping from in hole. 5:40 - a daggetti [>] n. (head stripes) came in from at least 50 yds away, did not go to hole but to nearby branch. More tapping, insistent now, from inside hole. 2nd bird away. 5:49 P.M.

8 Bird looks out - comes out - stays right by hole - shakes, whets bill - 5:50 - back in.

5:59 - tapping in hole - continues until 6:01.

6:06 male returns, ^{from opp. direction} in small aspen close by, now in nest tree. Tapping inside. To another

close tree. 6:08 Bird in hole looks out,

6:10 - Bird out, to mate. Both squawk, go off. 6:13. One ^{d.p.n.} in pine 30 yds away.

6:15 Comes near, seems disturbed at my presence. Fidgets around from tree to tree and branch to branch.

6:35 - still very nervous, having screamed about 73 times. To hole several times, ~~see~~ usually screaming there and twice squawking, but never in. I am only 20 yds away, quiet but in plain sight. I decide to leave rather than distress the bird any more.

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May 26 (cont'd.). At 6:45 P.M. I heard a tattoo from a big dead pine a few yards from nest #6, I saw a bird leave the tree but it flew out of sight right away.

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May 27. I have had to come into Alturas for more car repairs, so I will use this ~~so~~ time to summarize my data so far. I have 7 prs. of birds located, numbered from 1 to 8. Pair #4 has not been seen since first noted, nor has their prospective nest hole been worked on.

Racial characters:

#1 - nuchalis > daggetti x daggetti slightly
> nuch. Nest 5 ft high

#2 - d. x d. > n. Nest 4 ft high

#3 - d. x d. " 7 ft "

(#4)

#5 - d. x d. slightly > n. nest 7 ft high

#6 - d. x nest 5 ft high

#7 - n. ♂ x d. ♀ " 10 ft high

#8 - d. x d. > n. " 7 ft "

All the nests are in aspens between 8 and 10 inches in diameter, and numerous other holes of various age and depth in them. It seems as though several

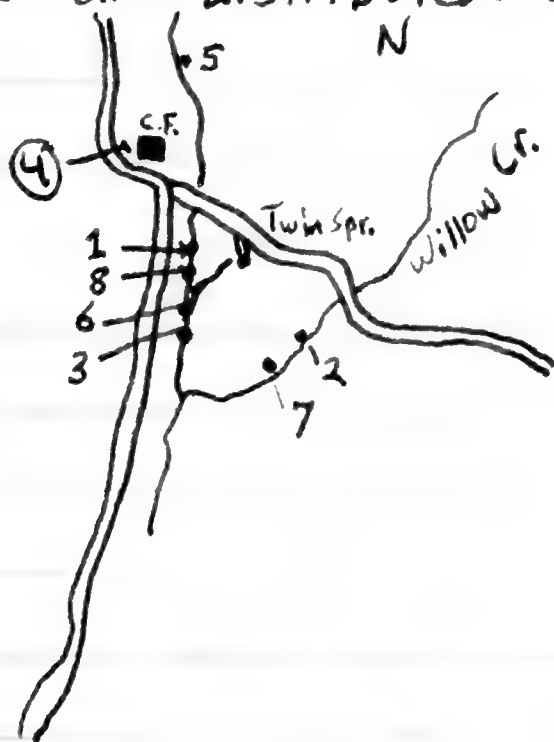
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May 27 (cont'd.) tests are made before a definitive hole is chosen, as there are usually several fresh looking holes which are left shallow. The holes do not consistently face in any particular direction. Both birds seem to participate equally in excavation and incubation. 5 eggs, not 3, seems to be a full clutch. The birds are very quiet most of the time except when disturbed right at the nest. The only way to find them is by luck and by poking around each hole-ridden aspen and watching for a bird to stick its head out. Possibly they are nesting in the pines too, but there are so many hole-ridden pine stubs that it will be purely fortuitous if I find any nests in those. The nests are distributed as follows:



(Not to scale:
(#s 1, 8, 6, 3 are not
so evenly spaced.
Aspens are
scattered irregu- (E
larly along the
creeks)

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May 27 (cont'd.). Observation times on pairs:

#1 - 8:15 A.M.; 5:00 P.M. 3:45 P.M.; 8:10 A.M. - 9:43 A.M.
2:30 P.M. 4:05 - 4:15 PM

#2 - 10-10:30 A.M. 5:15-6:00 A.M. 2:40 P.M. 11:30 AM
12:45 PM-12:55 AM.

#3 - 7:20 - 8:30 A.M. 7:25-7:55 A.M. 2:15 -

#5 - 7:10 A.M.; 12:55 - 2:50 P.M. 10:25-12:15; 6:30 PM
- 7:40 P.M. 4:00 A.M.-6:07 A.M.

#6 - 3:00 P.M. 5:30-5:50 P.M.

#7 - 12:10-12:30 PM

#8 - 4:30^{PM.}-6:35 P.M.

2 - 1

100

1

1

1

1

100

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Crowder Flat, 5200 ft., 38 mi NNW of Alturas,
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May 28 - 2:15 P.M. Nest #3 - one of pair
flushed from nearby tree as I approached.
Hole about 8 ft high rather than 7 - tree
about 1 ft in diameter. Climbed to hole
+ looked in with mirror - bird on nest,
would not leave. Withdrew about 20 yds.

2:35 - other bird back - in tree 5 ft away. Preens

2:47 - flies about to trees within 15 yds.

2:48 - To nest tree, 8 ft above hole. Preens.

I must leave as a rainstorm is approaching.

The bird flies to a tree about 10 ft away
as I get up. No sound has been uttered.

Chestnut-backed Bluebirds are nesting in an
aspen about 10 yds away. A ♂ Western
Tanager alighted near the nesting hole
while the other (non-incubating) bird was
in the same tree and was ignored. As
has been the case before, the Saps. will
frequently perch crosswise on small
branches.

May 29 - 4:30 A.M. - Rain. 5:10 A.M. Still inter-
mittent rains - heard saps. scream just out-
side the cabin. 6:25 More screams - then
steady tapping from tree where supposed
nest #4 is. 7:10 - more tapping - a daggetti
observed at "nest" (?) #4, looking in hole
and working low around the tree.

10:50 A.M. Still rain - 4 screams by cabin.

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May 29 (cont'd.) 1:25 P.M. A daggetti came to an aspen 1 ft from the cabin and tapped for a moment, then flew to a yellow pine. 1:32 - 3 sqwks by cabin. The bird works around in the aspens near the cabin, then flies across the meadow to the pines. There I hear him and see him drum on a fence post. It works around small pines, and then I lose track of it. Last seen about 100-150 yds from the cabin. 5:15 A.M. Heard a few screams, saw a sops. fly to a small pine near aspens across meadow. Steady rain far into the night

May 30 - Big rain clouds, occasional sun.

7:30 A.M. At nest #5 - no birds in sight.

8:30 - Squawks from about 50 yds away. 10:00 A.M.

Bird B(?) comes to tree 20 yds from hole. Preens

10:05 - Flies to low scrub close by.

10:11 - chickaree a few inches from hole.

10:15 - Rain. 11:15 I climbed to hole and looked in - wood chips, no eggs. The

squirrel has a nest in a hole about 6" away. Possibly it has caused the birds

to abandon. The squirrel remained in its hole, chirping, when I looked in. 11:35

Heard some tapping nearby. 11:50. Still no sign of the birds. More rain, I leave.

2:20 P.M. At nest #1 - the n. type bird

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May 30 (cont'd.) flies over me from near the nest to a pine 40 yds away. I leave as there is an active squirrel nearby.

2:30 Nest #8. I climbed the tree noisily and looked in — bird on nest, would not flush. 2:45 still no activity. Big stormy clouds coming up, so I leave.

3:20 P.M. Sunny. Back at #5. I must find out if this nest is really abandoned, and only watching and waiting will tell.

4:55 P.M. Still no sign of the birds

5:15 P.M. At nest #1 now. 5:33 — n, bird comes to tree ~~to~~ 5 yds away — taps, preens

5:35 — 3 chickarees go in hole above nest hole (5 ft above)

5:45 n. flies to tree 15 yds away from nest, blocked from my view. 5:46 To branches + trunks of big yellow pines 30 yds, then finally about 50 yds away. Gone to roost? No. 6:04 —

back to same spot as at 5:33 — screams twice. Preen. Squirrels still there, one

scampering about from hole to hole, but all above nest. No apparent attention from saps,

6:18 — away to pine 40 yds off. 6:19 — farther away yet. 6:37 — Heard screams about

100 yds away. 6:44 n. returns to same tree as before, taps loudly and screams. other bird out of nest, over to n.

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Crowder Flat, 5300 ft. 38 mi. NNW of Alturas,
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May 30 (cont'd.) - squaks. exchanged. - n. works to nest tree, hitches up + down it several times, screaming. Goes to hole, looks in several times - away, hitching up + down. After total of 41 screams, several half entrances, finally goes in hole ^{6:49 P.M.} I do not see the other bird - it may be close or not - certainly silent. 7:03 P.M. - several screams from about 50 yds away. 7:04 - One screams in tree 10 yds away from nest - 7:06 Answered by 50 yd away bird in a few moments. Both scream. One from away ^{daggetti} arrives, goes to nest, in 7:07. Other (n.?) screams nearby. 7:10 Robins, Flickers also noisy. "n." must have slipped off nest. 7:15 - 7:20 P.M. 20 slow screams from places from 60 to 30 yds away. Also Flickers, White-heads noisy. 7:23 All birds quiet - getting pretty dark. 7:25 Robins singing + calling in tree tops, in meadow. 7:35 P.M. Flashlight + mirror show bird on nest. Faint squawk.

May 31 Snow. (See Journal). 8:15 - Squawks outside cabin. 2 saps. there, both with nuch. tendencies, but mostly d. The continued to squawk, and followed each other

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← according to Mr. Archer,
at Willow Creek Ranch.

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May 31 (cont'd.) about low in the aspens,
pines, and a juniper (mentioned before in
connection with pr. #4). One would fly
a few yards away and soon the other
would follow and hitch toward the first,
sometimes upside-down around a branch,
sometimes around a trunk. Much squawking,
I believe by both birds. It was hard
to keep track, but I think both pursued
the other at one time or another—not
sure. A white-headed appeared close
by and called—it was chased not
very ferociously twice by one of the
birds. Then they each flew off in
different directions, the one I followed
behind the Ranger station. Screams from
the other direction, answered. The bird
I was watching flew across the
meadow then—8:30 A.M.

10:10 - At nest #7. 10:11. d. at tree
near nest - to another tree by nest -
Squaks - n. ^{comes} out, 10 yds away - back
to nest tree, more squaks. D. looks
in several times, goes in, 10:13. N.
is just above in a tree 2ft away,
preens. 10:16 - N. to nest, squaks -
I cannot tell from which or both - n.
back to previous spot. 10:28 n. to

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Crowder Flat, 5200 ft, 38 mi. NNW of Alturas,
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May 31 (cont'd.) nest - there are sqwks. -
d. out, n. goes right in without a look.
d. 15 ft away, back to 5 ft away
from nest tree. 10:34 - screams from
pines 75 yds away across meadow. 10:49
- a bird comes from the other direction
from the screams to the nest - it is a
daggetti > nuchalis, no breast band but
fairly distinct head stripes. D. arrives
from "scream direction" to nest - there
are sqwks - no sign of aggression - n.
out, d. > n. goes in nest. D. taps, moves
away a few inches, taps, back to nest,
sqwks. insistently. D. > n. out, remains
at nearby pine. D. in, 10:53. 10:54 -
D. > n. back to nest, sqwks., d. out, d. > n.
in. D. nearby - 5 ft away, taps, 11:02
Distant screams - across meadow, D. (?)
away about 40 yds, 11:04 - d. back,
sqwks. - d. > n. out, d. in. D. > n. taps
close by. 11:09 - d. > n. to nest, sqwks.
D. out, nearby; 11:10 - n. returns to nest -
head in several times; there are sqwks.
N. seems to be denied entrance. - goes
to previous workings 2 ft away. 11:16 - n.
goes to hole, squeezes in with difficulty
- n.'s head pops out, back in, out again,
all out. N. goes to close tree, taps.

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May 31 (cont'd.) 11:28 - d. returns from across meadow - to nest - sqwks - d > n out. D. looks in, goes in. D. > n screams from close by then (presumably) from afar. 11:32 - N. to hole - looks in - there are sqwks. - nothing comes out. N. to previous workings 2 ft away. 11:35 - N. flies over my head to pine 40 yds away, same side of meadow as nest. 2 screams. 11:38 - N. back next to hole, preens. 11:43 N. off to tree 5 ft away - hitches up, taps. 11:52 D > n to hole, - sqwks - d. out, to same tree as n., hitches toward n., a couple of feet higher. No apparent aggressiveness. N. flies to thicket along creek 30 yds away. D > n looks in hole, goes in, 11:53. I must leave; I am too chilled and wet and cramped to stay. At about 12:00 I passed #2, one bird flew a few yards away from near the nest at my approach. Rest of day - rain, hail, cold.

It seems from this brief observation that the nuchalis has been rejected as a mate, since he was denied entrance to the nest by both the other birds. This will require checking.

June 1 - See Journal.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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June 2 - Went out to Juniper Spring area, 2 mi. W. of Crowder Flat. At 10:00 A.M. I saw a daggetti working around in a Juniper and a dead pine stub - no nest seen. There were quite a few aspens along the small creek here, and some showed saps, workings, but I did not see a single hole in any of them. At 12:50 I saw a d. feeding silently in a Mt. mahogany. At 1:30 I heard several saps. screams nearby. At 2:30 I returned to the same Mt. mahogany; ~~a~~ at least 2 daggetti used it to feed on in the next half hour - one had faint head streaks and the other just a white post-ocular spot. They both used much the same route for leaving, and would remain only a few moments. They fed by poking their bills into the pits and grooves they had drilled from an angle quite off to the side. The spot was visited 5 times in the half hour. At 3:15, about $\frac{1}{4}$ mi. from the previous spot, I saw another daggetti; like the others, it was silent. This makes at least 3, probably 4 birds seen in this area, all daggetti.

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Crowder Flat, 5200 ft., 38 mi. NNW of Atturas,
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June 2 (cont'd.). Perhaps they are nesting in the dead pine stubs, which are full of holes. I have rapped on a lot of them and have not yet found a nest. Perhaps they are unmated birds, or just feeding away from the nests. At any rate, although they may show slight n. coloration, they are certainly d.

At ~~4:30 P.M.~~ 4:25 P.M. I went to nest #2 - it was empty except for a few wood chips in the bottom - not a sign of an egg shell. I suspect the innumerable squirrels or chipmunks nearby - I don't think a jay could get into the hole without difficulty.

This nest was only 4 ft off the ground - maybe a snake raided it. Disappointing.

4:30 P.M. At #7. 4:40 - d. to nest - sqwks - apparently from within, as d.'s beak did not open - n. comes out. D. goes to a close tree, then back to nest - then d>n comes out! D. in. D>n close by, taps n. away. D>n preens. Screams from across meadow. 4:50 loud sqwks; d. flies out, across meadow, but not toward the previous screams. From d., several screams, several loud tattoos - 60-75 yds away. 4:54 - 2 more screams from d. 4:57 n. to

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Crowder Flat, 5200 ft., 38 mi NNW of Alturas,
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June 2 (cont'd.) nest, looks in 5 times, in. 5:01 - sqwks - n. out, then back in. 5:05 - d back, close by, then to nest - sqwks - n. out. D. looks in, flies to close tree - catches an insect flying by without leaving perch - back to hole - more sqwks within - d > n comes out (it must have slipped in when d. left at 4:50), d. in. 5:23 d > n to close tree from across meadow - taps - to nest - sqwks inside - d. out. D > n looks in several times, in. 5:24 D. flies across meadow, alights half way up big yellow pine, 60-75 yds away. 5:30 D. comes to thicket along creek 40 yds away - much hopping about + crosswise perching. 5:33 - D. back to nest tree, then to hole - sqwks - looks in, d > n comes out, d. in. D > n remains in pine close by. 5:38 - N. arrives in nearby (5 ft) dead aspen. D > n goes immediately to nest - sqwks (from n?) - n. taps. D > n. repeatedly sticks head in hole, preens - sqwks - finally, d. out, d > n in. N. still taps. 5:40 - N. to nest - soft sqwks - n. goes in. 5:50 - soft sqwks, n. out, goes 1 ft. above hole, preens. 5:53 - n. back to hole - sqwks - looks in, in. 5:57 - D. comes 10 yds away, taps. D. to nest. Sqwks. N. out, d. looks in, half in several times, in. Sqwks. D > n out, to pine 5 yds away, preens, 6:00 P.M.

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June 3 - 8:07 A.M. At #7 - 8:10 - n. to branch near nest - sqwks - to hole - looks in several times - sqwks. - d. out, n. in. D. screams numerous times, ^{goes} away across meadow at least 100yds. 8:15 - D > n. to nest - sqwks - looks in several times, half in, goes all in. 8:16 - N. comes out, waits around at dead aspen 5ft away; preens, scratches, just like a daggetti. I can detect no difference in voice, either. 8:21 - N. to nest - sqwks - squeezes in. I could see n.'s bill open a little - perhaps the sqwks. are not wholly from the bird in the hole. 8:23 - D. comes from across meadow, goes to dead asp where n. was, taps. There also seems to be loud tapping from the hole. 8:25 - D. to nest - sqwks - n. out - d. ducks half in several times - sqwks - d > n out, to its usual small pine 5yds away. D. in, 8:26. 8:28 - D > n. to dead asp. 5ft away. 8:30 - D > n to small pine 40yds away - N. arrives with "crest" raised, sqwks - both seem to sqwk, hitch around pine, d > n perhaps slightly aggressive. N. over to asp by nest tree, d > n. to dead asp. Both tap loudly. D > n lost to sight. N. to nest, sqwks, d. out, n. in, 8:37. 8:38. D. back to nest, looks in several times, sqwks - n. still in. D. lost to sight. 8:39 - several tattoos heard 30-40yds away. 8:40 -

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June 3 (cont'd.) D. to nest, then to asp (live) 5ft away, preens. 8:43 D. to nest. 8:44 - sqwks - n. out, d. in. N. perches x-wise for a moment on small branch by hole, then to dead asp. Tree swallows are circling around the asps calling loudly, are ignored. 8:54 D>n. back from across meadow, to asp by nest tree - n. still in dead asp, preens. Now one (I couldn't make out which) chases the other, with sqwks. Both to nest, n. at hole. sqwks. - d. out, n. in, 8:55. D>n. in usual pine, 5 yds off. 8:56 - D>n to nest, sqwks, squeezes in. N. then comes out, to dead asp, preens. The tree swallows are constantly fluttering around, chattering, looking in nearby holes. 9:02. N. tops; then to nest, sqwks, Ind 9:10 - d. to nest - sqwks - n. out, to pine, to dead asp, to thicket along creek. D. at hole, alternates between sticking head in and preening - 9:12 - sqwks - (d.'s bill seen open) d>n out, d. in. 9:15 - d>n. to nest - sqwks - d. out, d>n in. 9:18 d. to nest - sqwks - d>n out. 9:26 - N. from across meadow to 1ft below hole - picks - up to hole he sqwks - d. out, n. in. D. screams several times nearby, 9:27. 9:29 More screams from across meadow. 9:29.5 - d>n from across meadow to asp right by nest tree.

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June 3 (cont'd.) Goes to nest, sqwks - head in several times, half in several times. 9:33 - away to live asp 5 ft away, taps. ~~Preens~~ between attempts to get in. 9:35 - D>n. back to asp right by nest tree - 2 ft from hole - taps. - to nest tree below nest - taps - looks in lower hole - to nest - sqwks - several attempts, finally squeezes in 9:37 - n. right out, to dead asp, then to thicket along creek; screams. 9:47 - N. to asp by nest tree - to nest - sqwks - several attempts, squeezes in. 9:56 - N. pops out, goes 1 ft. above hole, preens. 9:58 - sqwks - d>n out, n. in, D>n. to pine, preens. 10:01 - d>n to hole - sqwks - several attempts, in. out comes n., to dead asp. 10:06 N. to spot 3 ft. below nest - d. arrives from away to 6" to side of nest, sqwks - d>n out, to just below nest. N. to thicket; d. in; d>n. to asp by nest.

11:15 - At nest #3 - looked in - parent on nest, but heard cries and saw at least one newly hatched, naked pink young. Half an eggshell was present. 11:25 ~~other~~ Parent comes off nest, screams several times. Other arrives silently, both now on dead trunk by nest tree. 1st bird leaves, other looks in nest, goes in.

11:45 - Nest #6 - bird in hole. 1 ft just below is another hole with a House Wren nest in it;

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June 3 (cont'd.) the bird was also on the nest and did not move when I poked the mirror in.

At 11:57 another saps. was close by, moving silently from asp to pine. At 12:03 it came to a few inches beside the hole. This bird is a daggetti > nuchalis - fairly distinct ~~head~~ head stripes, no breast band. I heard nothing, but a strong wind rushing through the pines may have drowned out soft sqwks. The bird on the nest came out and was lost to sight. The 2nd bird picked around near the hole, then looked in it from the side, but did not go in. Next it flew to another tree close by, above the level of the nest. I took this opportunity to look in: the 5 eggs are still there, unhatched. I left immediately.

The bird on the nest was typical daggetti, with a faint post-ocular white streak.

At this nest site other picids and passerines are abundant. Nesting within 20 yds are House Wrens, Pygmy Nuthatches, Flickers, and probably Hairy Woodpeckers as well as other passerines.

2:50 P.M. At #7 again. D. in nearby asp. D>n. arrives from across meadow; ~~to~~ d. to nest tree above nest; d>n to nest - sqwks - d. out across meadow. D>n gets head in about 8 times, all in N. comes right out, goes to usual dead asp tops.

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June 3 (cont'd.). 2:58 - screams from stream
thicket 30 yds away. 3:09 - D. comes from across
meadow, to asp by nest, to 1 ft below nest, to nest.
sqwks - d>n out, d. looks in, goes in. 3:16 -
d>n comes to nest from usual pine - sqwks -
d. remains in - d>n looks in several times,
flies 15 yds away. 3:17 - again d>n. to nest,
sqwks, moves to one side - d. out, 15 yds
away, taps. D>n. looks in several times, in.
3:18 - d. to nest, then above - to nest, looks in,
goes in. I did not see d>n leave. 3:21 -
N. comes from across meadow, sqwks. To nest
(I see a bird leave from low on nest tree -
'd>n?'). N. "attempts" to enter about 8 times,
then flies 15 ft away. 3:26 - N. back to nest,
like no. of attempts, squeezes in. Silent, perhaps
2 very soft sqwks. in process. 3:30 - d>n. to
pine, to asp, to above nest, x-wise perch.
Silent. D>n. away, n. out, N. by hole, sqwks -
flycatches - to asp. 2 ft away, taps. 3:34 -
N. again to nest - sqwks - d. out, n. starts to
enter - d. drives ^{her} ~~him~~ aside, goes in. Then,
n. squeezes in. 3:46 ^{sqwks} + N. out, taps 5 yds away
3:50 - N. away. 4:05 d. arrives at nest
tree - sqwks - d>n. out, to its pine - d. over
to d>n, sqwks. Then d. back next to
hole, in. D>n. flies across meadow. 4:07.
4:10 - n. from across meadow - silent, ^{x-wise perch} looks in

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June 3 (u) nest at least 10 times - no response - to branch beside nest. Preens - preened between looks, too. 4:15 - returns to nest - looks in 6 times - faint sqwk - looks in several times more - sqwks - d. out, n. in. D. screams from away. 4:16 - I depart.

Howard's Gulch, 2 1/2 mi. W. of Canby, Modoc Co., Calif.

June 4 - see Journal for this day for account of sapsucker nest. I might mention here that there were several flies that looked like blow flies around and inside the nest hole. There were some droppings in the hole which may have attracted them. I am not sure that I saw both parents, but one at least was daggetti.

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June 5 - 9:00 A.M. At #7 - N. at hole - sqwks - several looks in - finally a birdy comes out (which I couldn't see), goes to asp. 5 ft away. Another bird flies across meadow. 9:05 - the relieved bird goes to the dead asp - it is d. D. then to nest - sqwks - squeezes in. Out comes n., over to dead asp, preens. 9:06 9:10 - n. to nest - sqwks - suddenly away, back, squeezes in. Sqwks heard. 9:12 - d > n

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June 5 (cont'd.) at nest — a bird flies across meadow — d? — sqwks — 6 or 7 attempts, d > n squeeze in — then out it comes again, perches x-wise on branch — to asp close by — taps. Flies out in small semi-circle, back within 10 yds of nest. Taps. 9:16 — d > n back to nest — sqwk. — several attempts, gets in. Sqwks. Now n. comes out, goes to dead asp. 9:20 N. flies to thicket along creek. lots of sqwks — 2 sqps. in thicket — n. seems to pursue ~~one~~ the other (or follow). One bird flies out across meadow. 9:26 — sqwks — 2 sqps. in thicket again. one of these is n. hopping about perching x-wise. 9:32 d. to side of nest, sqwks — d > n. out. ~~Then d~~ N. to nest tree 3 ft below nest. D. in. D > n flies away at least 200 yds. 9:34 N. to nest, — sqwks. — squeezes almost all in (after several attempts), backs out. sqwks. D. out, n. in. 9:35 — D. below nest, hitches up to it. Silent. D. squeezes in. N. must have slipped out — now I see ^{her} fly to creek thicket. 9:49 — ~~it~~ (?) to nest, in. silent. couldn't have been — 9:50 — n. from thicket to dead asp, taps vigorously. N. to nest. — sqwks — d. out, to pine 40 yds away nest-side of meadow. N. in. 9:52 — scream from d., now in thicket. D > n to usual pine

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June 5 (cont'd) by nest tree - taps, preens.

Now d. to same pine - sqwks - they approach each other sqwking, "crests" up, perching x-wise on horizontal limb. d. flutters wings slightly. D>n. to nest, d. out across meadow. D>n looks in several times, goes in. N. comes squeezing out (head first, as all always do) and goes to dead asp. Preen - 9:55. 10:00 A.M.

N. to branch by nest, to nest - faint sqwk - looks in, squeezes in. 10:02 - faint scream from across meadow. 10:09 - a bird suddenly appears at nest, goes in quickly and silently.

10:14 - n. at nest (just come out?), goes to workings in asp. 2 ft away. 10:22 - n.

flutters out, alights on branch by nest; sqwks - to nest, several attempts, with

sqwks - squeezes in. 10:26 - d. to same branch by nest, preens, whets bill. To

nest; n. out; d. pauses to ruffle feathers, then goes in. 10:27 - d. out, below

nest. D>n. comes out of nest, d. up, back in. 10:31 - d>n in asp 5 ft away,

taps. 10:33 - d>n half flies, half flutters,

sqwking over to thicket along creek: there is d., or at least a d. D>n chases d.

"crests" raised, sqwks. 10:35 - one of the saps. flies to nest, pops in.

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June 5 (cont'd.) 10:38 - d > n from thicket to asp
right by nest tree - taps, preens. 10:41 - d > n
flies up in dead asp - sqwks - n. comes
fluttering out, perches x-wise in ^{another} nearby
dead asp. D > n to nest - sqwks - d. out,
to "original" dead asp. D > n. in. Now n.
to nest, sqwks, several attempts, gets in.
10:50 - n. out, on branch by nest. Sits idly, preens.
10:52 - n. back to nest, sqwks, squeezes in.
10:58 - n. out again - I think he backed out -
pauses at nest, then over to dead asp,
preens. 11:05 - n. from dead asp to nest - sqwks -
flies out, gets insect from aspen leaves, back
to below nest, then to branch beside it. d.
arrives from ~~this~~ ^{the nest} side of meadow, to nest,
sqwks. d > n. out, d. in. 11:07 - now n.
to nest, sqwks; d. out, n. in. d. in asp
5 ft away, preens, 11:09. d. back to nest,
sqwks, goes in. Out comes n., stays at opening.
Sqwks, looks in, then flies down to thicket.
11:14 - d. out, to pine 10 yds away, then
right back to nest, in. Silent. 11:21 d.
again out, to pine 20 yds away, perches
x-wise, Then, directly back to nest, in; silent.
11:30 - n. to branch beside nest, picks, preens.
11:36 - n. to nest, faint sqwks, d. out, n. in.
d. flies to pines 100 yds across meadow,
screams repeatedly - at least 10 times.

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June 5 (cont'd.) 2:05 P.M. - at #1. From a distance, I saw the birds change places on the nest. The chickarees are still in the nest tree. 2:17 - d. arrives ^{beside} ~~at~~ nest from at least 40 yds away - to nest - squaks - n>d. out, d. ~~in~~ away to nearby. 2:18 D. back to side of nest, then to nest, in. Silent. 2:20 N>d. in aspen 20 yds away, now to nest, silently, in. ~~D.~~ D. out again, to the nearby asp. Now d. back to nest, in, n>d. out to the 20 yd asp. Another exchange; I am not sure which bird is in - 2:25 - A bird goes to nest, in. 2:30 - both birds out - 2:32 - d. goes in, n>d. away. 2:33 d. out, to nearby asp. 2:38 n>d. returns to nearby asp, seems to have insects in beak. Goes to nest, in. out again, to asp, to fence post, then 50 yds away to a pine. 2:45 P.M. - I approached the nest and was surprised to see a bird leave - must have been d. In the nest were several naked pink young - I could not count them accurately. They raised feeble cries. 2:55 - at #8. D. arrives at nest with beakful of big ants - nervous, then goes in. Silent. 3:02 - bird looks out, comes out to dead asp close by. I look in. I can see one newly

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June 5, ~~1949~~ (cont'd.) hatched young, one egg which seems to be in the process of being pipped, one which looks half-pipped. My position is a ~~big~~ bit precarious, but at least it is evident that this nest is just hatching. One of the young cries out.

3:25 P.M. - At nest #6 - at my approach a saps. looked out of the hole without protruding its head, and when I came closer it ducked back in. I looked in; the parent was brooding young, and I could see one naked young one and a broken eggshell. The young were crying. All the nests I now have under observation - 5 - have young with the possible exception of #7. The hatching times seem to be very close.

3:40 P.M. Nest #3 - one bird at branch close to nest, to nest, one sqwk. Other bird out, 1st bird in. "Out" bird flies 15 yds away, then lost from sight. 3:50 - bird out, to small dead asp 15 yds away - picks, preens. 3:53 - to closer asp, 6 ft away. Mate comes flying up, to asp next to it. Mate to nest, in. Mate comes out, back to previous perch. Other goes over to nest tree below nest, then across meadow ~~to~~ 20 yds off. Mate to branch by nest, preens. 3:58 - away to thicket, 15 yds.

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June 5 (cont'd.) 4:00 P.M. Bird back at branch by nest, then over to same small dead asp. Makes several fluttery flights over meadow catching insects on wing. Back to branch, to nest, in nest. 4:03 - Bird off nest, to the small dead asp, out flycatching. 4:05 - other arrives in asp 6 ft away, then to branch by nest, then up to pines across meadow, about 50 yds away. The other bird to branch, to nest, in nest. Out again, carrying something in beak. Goes 20 yds away. 4:10 - bird to dead asp 6 ft away, to nest, pause, in. Out again to 20 yds away, same route and place as just mentioned. Back to branch by nest, to nest, in 4:11. Out again, same 20 yds away, back to branch by nest, flutters out flycatching, back to branch, to nest, in, out, carrying something, same 20 yds - back same route, in, out with something looking like eggshell, to 20 yds away, to small dead asp 15 yds away, to branch, to nest, in, out with more debris. 4:14. Back to branch, to nest, half in, backs out, to asp 6 ft away, preens. 4:17 - out on 2 flycatching trips - other bird comes to asp 6 ft away - squaks - one bird to nest, other away. Bird to branch by nest, away.

(2 chipmunks up nest tree, one in hole

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June 5, (cont'd) above it; other chased by angry House Wren) 4:24 - Bird to nest, sqwk, in.

4:25 - chipmunk up again, driven down to ground by House Wren. 4:27 Bird from across

meadow to branch, to nest, in. One (~~same~~) comes out, to branch, whets bill. Now over

to aspen 6 ft away. Back to nest tree, below nest. To branch, taps. Preens. 4:32, to tiny

pine at base of nest tree, to asp 6 ft away, then to dead asp 6 ft away. ~~Flutters~~ Flutters

over to cluster of branches of fallen asp 10 yds away, perches x-wise. Hairies

have been drumming incessantly about 50 yds away, with no apparent attention from the saps.

June 6 - 3:55 A.M. at nest #7 - skies light, sun not yet up. Many song birds noisy

(see Journal), 4:08 AM - Heard tattoo, then another, seemingly about 50 yds away.

4:10 - 3rd tattoo, more distinct, then another.

Still sounds pretty far from nest. 4:17 d>n out of pines 15 yds away to nest - sqwks -

d. out. N. from pines 20-30 yds away, to branch by nest, sqwks. D>n in. 4:20 - N.

over to nest - sqwks - several attempts, squeezes in. 4:21 Sqwks - d>n out, to usual pine,

preens. 4:26 - D>n back to nest - sqwks - several attempts, gets in. N. emerges, with

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June 6 (cont'd.) what looks like a piece of eggshell.
N. goes to creek thicket, screams several times.
4:30 A.M. - Distant screams from across meadow,
then loud tattoo from about 40 yds away,
on west side of meadow. 4:34 - d. to nest,
looks in - silent - to asp 5 ft away - back
to nest - sqwks - several attempts to get in -
sqwks - squeezes in. More sqwks. Then d.
out again, down below nest, taps. 4:37 -
D. lost to sight - screams and a few "yelps"
heard across meadow. 4:39 - more screams
from across meadow 60-75 yds away.
4:41 - N. from meadow to branch by nest - picks,
preens - to nest sqwks, squeezes in.
4:44 - faint tattoo from meadow or across it.
4:48 - ~~d.~~^{d>n} out, to dead asp; preens. 4:52 D.
comes from meadow - to nest tree, not to
nest - d>n. leaves - d. perches x-wise on
branch by nest, hitches around several
close asps. Then below nest (4 ft below)
sqwks. N. comes out, stays 15 yds away.
D. goes up, into nest. N. to pines 30 yds
away. Screams heard in other direction, across
meadow. 4:55 - sun now in tree tops the
west side of meadow. 5:10 - d>n comes to
asp 5 ft away, picks. 5:11 - to nest, sqwks -
d. comes out, to pines 10 yds away, d>n.
goes in. Screams from across the meadow.

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June 6 (cont'd.) 5:17 A.M. - N. from across meadow to branch by nest - taps, preens. 5:18 - to nest - sqwks - several looks in. Still by nest, preening + looking in. 5:21 - away to thicket along creek, 30 yds away. Screams, taps. 5:25 ~~to~~ D. to ^{above} nest from nest side of meadow. Picks, preens in sun 1 ft above + just to side of nest - To nest, sqwks - looks in. Backs down 1 ft., picks, preens. 5:27 - to nest; sqwks - d>n out, d. in. (At 5:20 the sun began to reach the nest tree; the nest is directly opposite to the sun in the morning.) 5:32 - D>n to nest from nest side of meadow - sqwks - d. out, d>n. in. screams from across meadow. 5:37 - distant tattoo. 5:47 - d. to branch by nest from nest side of meadow; to nest - sqwks - d>n out, to "usual" pine. D. in. 5:49 - D>n over to asp 2 ft from nest. 5:52 - N. from ~~the~~ ^{nest} side of meadow to nest with loud sqwks. D>n. away, to across meadow D. out, to small pine 20 yds away. N. goes in. D. screams, perching x-wise on a small branch. 5:55 more screams, presumably from d. 6:00 AM - I leave. Rest of day spent looking around to east of here. One saps, a d>n. seen - see Journal.

June 7 - 3:55 A.M. at #1 - Robins singing, Chickadees calling - just ~~be~~ barely light enough to write. Sky clear after yesterday evening's

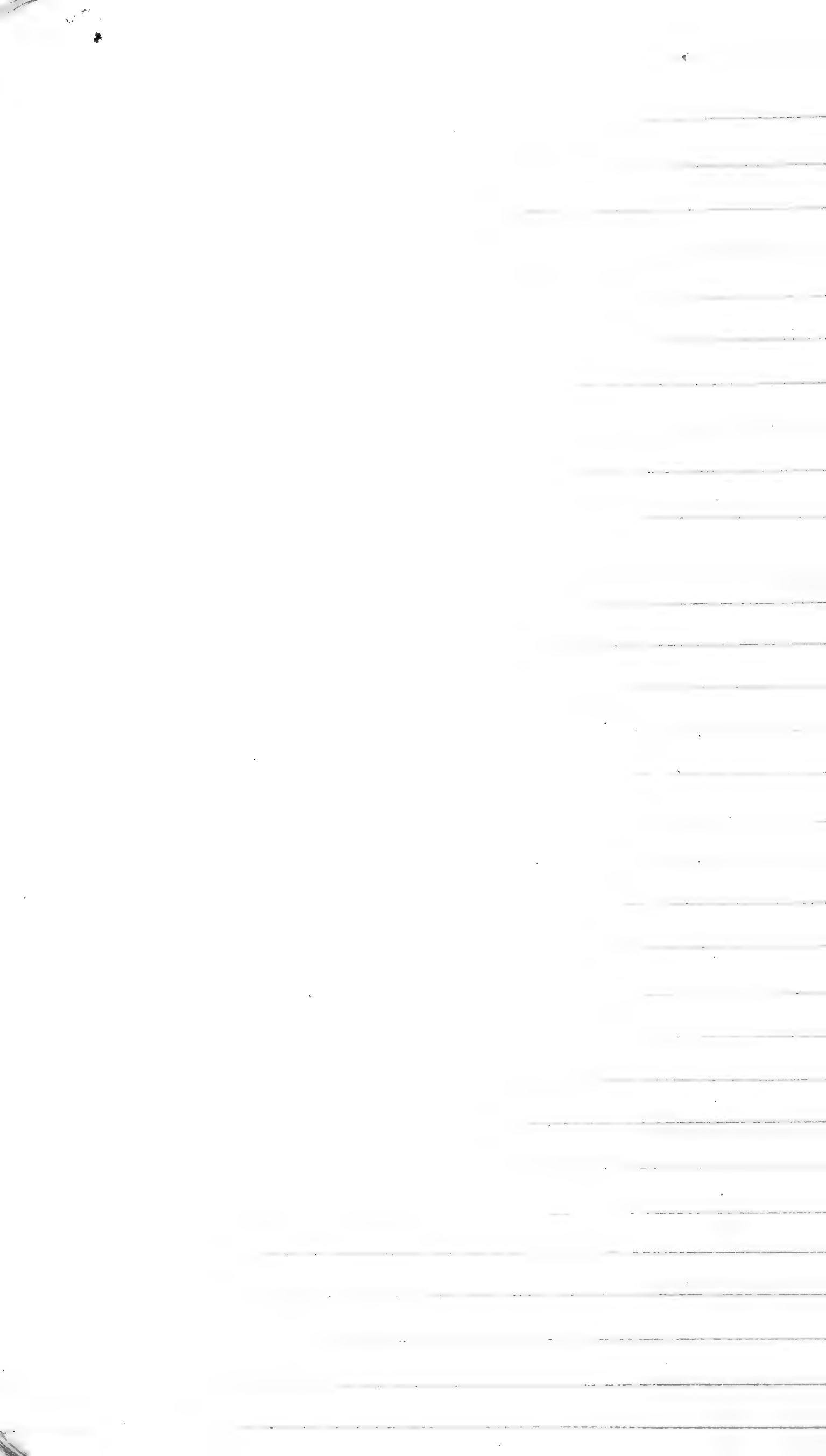
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June 7 (cont'd.) Thunder shower and hail storm
~~2:5~~ 4:00 A.M. 3 screams, about 50 yds from nest. 4:05 - Bird off nest, to big pine 15 yds away, under which I sit; other to nest, in. screams from "pine" bird - other out, to fence post between nest + pine, screams; back by nest, to one side, more screams - over to nest. Pine bird screams once, other "replies". Bird at nest in, then out to asp 10 yds away. Too dark to tell which is which. "Asp" bird screams. I am 20 yds away, seated quietly but not concealed at all - too close? 4:12 Asp bird back beside nest - 2 screams - to nest, in. 4:15 - I withdraw to about 30 yds away. I hear drumming (Hairy?) and Flickers begin to call. 4:20 - Heard one saps. tattoo. - again - about 25 yds away from nest. The clouds in the east are turning orange now. 4:24 more possible saps. tattoos; now some that isn't. 4:26 - definite saps. tattoo; again, again. There seem to be two birds doing it, one farther from nest than the other. 4:30 - Squaks - one bird out, away 40 yds to west - other beside nest - to nest, in. The tattooing continues through this exchange, so pr. #1 is not involved. I'm afraid I am still in doubt about whether the tattooing is done by saps. - possibly some, certainly not all.



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June 7 (cont'd.) 4:37 n>d beside nest — d. out;
to big pine as before. N>d with food, to
nest, several looks in, in. All silent. 4:38 —
n>d out, to asp 10 yds away, taps, 4:39
n>d back to nest, looks in, in. 4:43 — d.
to ^{beside} nest from east — sqwks — n>d. out, d. in.
4:45 — d. out, to workings in asp. 15-20 yds
away, taps. Now to closer asp, vigorous taps.
Then to about 40 yds away, taps. 4:48 — n>d
to beside nest from east, screams twice,
looks in, several times, goes in. So far
both birds have always alighted beside
the nest, to the east, before going to it.
The tree (dead) has about 5° of a lean to
the SE; perhaps this is why. 4:56 — now
d. arrives from north; one faint sqwk —
n>d. out, away about 40 yds to west. D.
hitches to east side, to nest, in. 5:01
n>d to dead asp 5 yds away, from west; to
beside nest; d. out, n>d to nest, looks in,
in. All silent. 5:08 — d. arrives from north,
hitches to east side of nest — n>d sticks
head out; sqwks; d. has food; n>d out,
away to west. d. to nest, in. Chickarees
are active in the nest tree, have been since 4:30.
5:11 — n>d arrives in dead asp 10 yds away
from south; to east side of nest, food in beak;
one faint sqwk. — d. out, n>d. looks in 2-3 times,

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June 7 (cont'd.) goes in nest. 5:20 D. to ~~nest~~^{east} side nest from north; sqwks; n>d out, to west, d. in. 5:22 - d. out, to asp 15 yds away; now to one 10 yds away, taps. 5:23 back direct to nest, in. 5:26 - N>d comes to asp 5 yds away, from west, to east side of nest; a sqwk. - d. out, to close by, then away to west as n>d looks in 3 times, goes in. 5:33 - d. beside nest - sqwks - n>d out, d. in. N>d. flies off to north, screams at least 50 yds away. 5:40 - n>d ~~at nest~~ beside nest with food; d. out; n>d looks in twice, goes in. The food in these cases is dark - perhaps big ants again. 5:48 Sun on nest. 5:50 - D. to beside nest from north; sqwks; n>d out, d. to nest, in - no looks. 5:52 - n>d in dead asp 10ft from nest - now to asp on other side, about 6ft away. 5:54 - n>d over to clump of Mt. mahogany 50-60 yds away to south; taps. 5:57 - n>d back to south side nest, hitches to east. sqwks - d. out, flies on well past 100 yds to north; n>d. in. 6:00 A.M. - I leave.

6:50 - By the Ranger station, in the aspens there - 2 saps (d.) present. One flew towards the other, squawking. The other flew off to a board nailed horizontally between 2 aspens and began to tattoo, perching cross-wise and preening also. The first bird

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June 7 (cont'd.) remained nearby, tapping noisily. As the 2nd continued to tattoo, the 1st flew over towards it again, squawking, but it held its ground. The ~~2nd~~^{1st} flew back, tapped some more, then flew across the meadow to some Mt. mahogany; there were squaks. The 2nd tattooed once more, then went farther off in the aspens.

9:30 A.M. At #7 - went to base of tree, heard loud tapping within and what sounded like the cries of young. 9:32 - N. comes out of nest, stays right at hole, looks in several times, in again. Silent.

9:37 - N. out again, to branch by nest, to dead asp, preens. 9:40 - N. around + about pines within 20 yds from nest tree. Loud tapping from within tree. 9:47 - N. to nest again - squaks - pauses - looks in, goes in. 9:52 - D. to nest - squaks - to branch beside nest - to asp 2 ft away - squaks. Preen. 9:57 - 2 squaks. 2 more.

D. to nest - squaks. N. out, d. in, 9:59.

10:00 AM - D. out - squaks - to dead asp, preens. 10:09 -

D. hops around a bit, doing x-wise perching. 10:10

D. to nest - squaks - ~~d~~^{drn} out, d. in. Drn. goes to small pine 30 yds away. 10:13 - screams from

across meadow 100 yds away. 10:15 - D. out, with something in bill, to 15 yds away - then back to nest, in. 10:29 - D. out with object in bill, to

15 yds away - 4 screams - back to nest, in, 10:30.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas,
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June 7 (cont'd.) 1:45 P.M. - at #3. 1:48 - Bird to branch by nest, then to nest - sqwks - one out, to large pine 30 yds away. other to nest, looks in, in. 1:50 - bird out, to asp 5 ft. away, taps. Then lost to sight. 1:56 - Bird to nest, in, out again, other comes to asp 5 ft, away sqwks. 1st bird away; 2nd to branch by nest, to nest, away, to nest again. Now I think both are away. 2:01 - bird comes from 30 yds away across meadow - to nest, pauses, in. Now out, to branch by nest, flycatches, to small dead asp, away. 2:03 - bird to nest, in, out again to asp 5 ft away. other bird there; sqwks. 1st flies off; 2nd to branch by nest, to nest, in, comes out with debris in bill, away. 2:05 - Bird to branch by nest, to nest, in, out, ^{whets bill on branch,} flies over 100 yds away. 2:08 - bird to branch beside nest, to nest, in. 2:09 - Bird out, to asps 15 yds away. 2:14 - bird to dead asp 6 ft away from across meadow; to nest, in. 2:18 - 2nd bird from across meadow to branch by nest, to nest, to branch to nest; sqwks - 1st bird out, 2nd in. Now 2nd out, to small dead asp, to asp 6 ft away; now back in nest. 2:21 - bird from across meadow to branch by nest - to nest - sqwks - one out, to asp 6 ft away. other bird goes in. one from asp goes 40 yds off, screams. other

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June 7 (cont'd.) goes out of nest, lost to sight.
2:28 - bird to nest from across meadow, to branch
by nest, to nest, in. Out with debris to small
dead asp. 2:29 - A bird to branch by nest
from north part of meadow - to nest, in,
out, away. 2:30 back from north of meadow,
same route to nest, in, out, off 20 yds.
On some fallen asp trunks, gathers insects.
2:31 - to asp 6 ft from nest, away flycatching
to fallen asp log again. Now up to dead
asp 20 yds away, tattoos loudly. To 50 yds
away, tattoos twice more - again. 2:34 - bird
from across meadow to 30 yds away; now to asp
6 ft away; now to asps 10-15 yds away. 2:36
to branch by nest, to nest, in, out to branch,
away to east. ("Across the meadow" is west)
2:37 - Loud screams from 60-75 yds away. 2:41 -
bird from across meadow to branch by nest, to
nest, in. Bird looks out, comes out with debris,
flies away at least 40 yds to west. 2:46 -
bird from asp 6 ft away to nest by usual route,
in, out, away. "Usual route" will refer to branch
beside nest, then to nest. Bird from across
meadow to nest usual route, in 2:48. Now out.
2:49 - back to asp 6 ft away, taps. Rain clouds
coming up. Other bird comes up, goes direct squaks.
goes direct to nest, in. Tapping bird flies off.
3:05 - Bird to nest usual route; squaks - one out

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June 7 (cont'd), other in. This bird now out too.
3:12 P.M. - bird to nest, usual route, in. 3:14 -
bird out, to small dead asp, picks, preens. 3:15
other bird to nest, ^{squaks} usual route, in, out, to asp
6 ft away, taps, seems to be getting sap from
fresh drillings in bark. To dead asp next to it
now, flycatches, over to the small dead asp,
now to a log on ground, over to other fallen
logs 10-15 yds away. 3:17 - back to nest tree,
to nest, usual route, in. 3:22 - squk - bird out
to branch by nest, preens, flies away at least
100 yds. 3:26 - bird from across meadow to
dead asp 6 ft away, direct to nest, in.
3:29 - squks heard - from nest? 3:30 - bird out,
to small dead asp, preens. 3:31 - other bird
comes direct to nest - squks, goes in, comes
out, flies across meadow. Loud squks. Screams.
75-100 yds away - close to nest #6? 3:37 -
bird to nest from below, out, to branch by
nest, to dead asp 6 ft away, to fallen
asps 10-15 yds away. I believe the birds usually
bring food, but it is hard to see. 3:39 - bird
to dead asp, direct to nest, in, out, to asp
6 ft away, then across meadow at least 100 yds.
3:40 - bird direct to nest, in, out to asp 6 ft
away, then across meadow. 3:43 - bird to
nest, usual route, in, out to branch by nest, whets
bill, flycatches, to dead asp 6 ft away - now

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June 7 (cont'd.) chases chipmunk along fallen log.
Other bird present, to nest, in, ^{out}. One goes
to fallen logs 10-15 yds away - 3:45. 3:47
Bird from across meadow to nest, usual
route, in, out. I leave.

June 8 - 8:05 A.M. - near (100 yds away) nest
#1, I saw a ♀ Williamson Sapsucker up in
the top of a large dead pine drumming. The
noise was much like a Red-breasted's tattoo,
but slower. This is the first Williamson I
have seen on this trip. 8:10 - At nest #1
8:13 - Bird arrives east side of nest; other out,
1st bird to nest, looks in twice, in. From
here on, "beside nest" means on the east side
of it. 8:18 - bird arrives in asp 10 yds away
from west - to beside nest - bird comes out,
other to nest (with food) in. All silent, as far
as I can tell; I am about 25 yds away.
8:30 - D to asp 5-6 yds away, to beside nest -
2 sqwks - n>d. out, d. in, 8:31 - d. out
8:34 - n>d. from west to beside nest with food,
to nest, in. Now d. to beside nest with food,
Sqwks - n>d. out, d. to nest, in, out, to
beside nest, away, to beside nest. Now n>d
returns to beside nest with food - sqwks - n>d
in. 8:37 - a bird leaves, I'm not sure which.
8:39 - d. to west side of nest tree, hitches to
east, to nest, in (with food, as usual.)

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June 8 (cont'd.), D. must have left — 8:41. N>d.
to beside nest from west, to nest, looks in,
in. 8:42 — D. from west to beside nest, to
nest, sqwks — N>d out, d. in. In all these
visits, food is brought; it is held in the beak
up close to the gape. 8:46 — N>d to ~~nest~~ beside
nest from west — silent — d. out, away to west.
N>d. in. Most of the traffic seems to be
to the west side this morning; the birds arrive
from at least 40 yds away and fly off at
least that far on leaving. 8:53 — D. from
west to beside nest — sqwks — N>d out, away
to west. 9:00 A.M. — N>d to beside nest, d. out.
N>d. to nest, looks in 3 times, in. Silent.
D. 20 yds away, flycatches, light on fence-post.
9:05 A.M. — At nest #8. Hairies and Robins set
up such a racket that I leave. I saw the
d>n bird, and at 9:10 d. came to the nest
with food, so nervously, apparently because
of all the scolding, that I decided not to
stay. 9:20 — At #6 — I can hear tattooing
near #3, about 150 yds away. 9:23 — I hear
sqwks, see a bird go in nest. 9:27 — A d>n
comes beside nest, sqwks — other out. D>n.
pauses, goes to nest with food, looks in 5
times, goes in. 9:33 — d. arrives at nest, sqwks.
D>n out, d. looks in, in. With food. 9:35 — D.
out, away. 9:38 — still tattooing at #3.

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June 8, (cont'd) - 9:40 - D. beside nest, with food, to nest, looks in, in. 9:42 - D>n to beside nest with food; squks - d. out. D>n pauses, hitches around tree to nest, looks in 4 times, goes in. 9:45 - a herd of horses comes strolling up, spoiling the observation. I leave.

The habits of these pairs all seem to be quite similar. At least every 10 minutes, regardless of the time of day, one parent comes up with food and usually goes in the nest for a few minutes. Soon the other comes up, there are squawks, and places are changed. They seem to have stereotyped ways of going to the nest once they are at the nest tree. The cruising range of these birds must be at least 200 yds, probably more. I have seen them come off the nest and keep right on going for well over 100 yds until lost to sight.

1:50 P.M. At #7, after long walk with ladder, and ^abrush with the stock in the meadow.

1:56 - D. to nest; squks - N. out, to dead asp.

D. looks in several times, in. N. taps. Squks from nest. D. out, below nest 1:58 - back to nest, more squks - d>n out, d. in.

2:00 - squks - exchange I could not follow -

D. out. 2:20 - Another exchange - d>n to nest, squks - another bird out. I go up to

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June 8 (cont'd.) nest, climb to it and look in. D>n. remains close, sqwking. Inside, and I could see almost all the bottom, - are 2 naked young and six eggs, one of them cracked around the center, possibly hatching. There was another part of the nest to the side into which I could not see. At 2:25, N. came to the nest, sqwks - a bird out, n. in. At 2:29 there was another fast exchange, with sqwks. Apparently my interruption was not permanently disturbing. 2:32 - D>n to nest, sqwks, looks in a few times, goes in. 2:33 D>n. out, to asp a few feet away, preens. 2:38 - D>n. back to nest, sqwks, many looks in, finally squeezes in. Out comes n. half way, long pause, all out, stays by nest, then squeeze back in. 2:39 - D. to nest, one of others out, across meadow. D. looks in, sqwks, goes in. Then d. out again, returns to nest, many looks in, goes in. 2:41 D. out, to dead asp, ~~away~~. 2 screams heard across meadow. 2:43 - D. to nest again - sqwks - d>n out, d. in. 2:55 - Harry to nest tree well above nest, taps. 2:59 - D>n. to asp 5 ft away, taps. Now to nest, sqwks - d. out, d>n. looks in twice, then goes in. 3:00, I caught a glimpse of a saps. chasing another bird by the nest - which bird I can't say. 3:03 - N. to nest from across meadow - sqwks - looks

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June 8 (cont'd) in several times, goes in, 3:12 - D. to branch by nest, whets bill; to nest, sqwks, N. comes out, d. looks in, goes in. 3:14 D>n in asp 6ft away, tapping. 3:15 to dead asp, taps. Chases House Wren, not very furiously. 3:17 D>n. to nest; ~~d.~~ sqwks - d. out, d>n. in. 3:18 D. flies across meadow, at least 50 yds. N. to small pine 40 yds from nest, on nest side of meadow. Taps, preens. 3:23 - D. to branch by nest from across meadow, to nest - sqwks - d>n out. d. looks in, goes in. 3:24 - N. from across meadow to branch by nest, sqwks. Goes to nest - sqwks - d. out, n. looks in, goes in. Screams from afar. 3:34 - D>n at nest, sqwks - many looks in, half in - more sqwks - n. out, d>n. in. 3:46 - D. to nest, sqwks - d>n out, d looks in twice, goes in. 3:47 - D>n to asp 6ft away, feeds, taps. Now down to thicket along creek. 4:00 PM N. to branch below nest, perches x-wise, sqwks. D. out, n. to nest, looks in 5 times, goes in. I leave.

This is a peculiar situation. All 3 birds seem to get along amicably for the most part. Are there 2 ♀s, or has one laid a double clutch in response to having 2 mates? There is a recess in the nest cavity out of range of the mirror, and there may be more eggs or young hidden there; then would be a perfect double brood.

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June 9 - 7:40 A.M. AT #3. 7:43 - Bird to nest by usual route; sqwks - one bird out, other goes in. NOTE: in the following account the terms bird A and B, or just A + B, will be used to designate the different birds at any particular incident; these two are just alike and A may refer to one bird one time and the other the next. This will save writing "first bird," "other bird," etc. 7:48 - A to nest, usual route (call it "u.r."), sqwks - A to branch by nest, B out, A to nest, in. 7:58 - B to nest, u.r., sqwks - B to branch, A out, B goes in with food. 7:59 - B out, to asp 15 yds away, down low to ground, gathers food. 8:01 - B back to nest tree, to nest, u.r., in, out, to asp 6 ft away, away across meadow. 8:04 - A to nest from across meadow, u.r., to nest, in, out with debris to small dead asp. Taps, preens. A. flycatches, now away at least 50 yds - 8:07. 8:07 - B to nest, u.r., - I can hear cries of young from 20 yds away - B in, out, away across meadow. 8:10 - A to nest, u.r., in, out, to asp 5 ft away, A. flycatches. 8:11 B to nest u.r., in, out, away across meadow. B in asps 15 yds away. 8:14 - Saps flies over nest from across meadow. 8:15 - B to nest, usual route, in, out, away. Young plainly audible. As mentioned in previous notes, House Wrens

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June 9 (cont'd.) have a nest 6ft higher in the same tree. 8:17- A to nest direct - one sqwk - in, out, away to small dead asp, back to asp 6ft away, taps, feeds. 8:19 - back direct to nest, in. Now B to nest, to branch, back to nest, sqwks - A out, B in, A out to small dead asp, back to nest tree, to asp 6 ft away, feeds in same spot. A flycatches, goes to asp 15 yds off. 8:22 A now to nest direct, in. 8:26. B to nest, with food, u.r. - sqwks - A out, both to branch by nest - then B to nest, in. A away. B out with debris, takes it to small dead asp, drops it. This is the usual procedure. B flycatches, around small dead asp. B now (8:30) back to asp 6 ft away, feeds; then over to asps 15 yds away, flycatches. Back to nest tree - A arrives, u.r. sqwks, A in. 8:34 - B to nest, u.r. sqwks - A out, B to branch, in, out to small dead asp, back direct to nest after flycatching, in. 8:36 B out with debris - looks like feces, to small dead asp, drops it, to branch by nest, taps. 8:38 - B to nest, in. 8:39 - A direct to nest, sqwks, A to branch, B out, A in. A out with feces, to small dead asp, drops them. To asp 6 ft away, taps, to nest u.r., in. 8:46 - B to nest u.r. sqwks, to branch by nest, A out, also to branch, B to nest, in, out, with feces to small dead asp, drops them, back to nest u.r., in, 8:49. out of sight.

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June 9 (cont'd.) - 8:55 - A direct to nest, sqwks; to branch, B out, away, A to nest, in. A with food, as usual. 9:02 B to nest direct, sqwks, to branch, A out, B to nest, in. B out, to asp 6 ft away, then away. Young noisy. 9:07 A to nest, u.r., in, out to branch, up above nest, to asp 6 ft away, feeds, away across meadow. Back, u.r., to nest, in. 9:08 - out with feces to small dead asp, drops them. B 15 yds away - sqwks - B to nest, u.r., in. 9:11 - A to nest direct, sqwks - to branch, B out, A to nest, in. A out with feces, to small dead asp. ("sda") drops them, away across meadow. Young noisy. 9:15 - B direct to nest, in, out with feces to sda, drops them. A to nest, u.r., in, out with feces to sda, back to nest u.r., in, 9:17. B in asps 15 yds off. B now flies over 50 yds away. B to nest, u.r., in, 9:20. 9:22 - A direct to nest, sqwks - to branch, B out, A in. 9:30 - B to asp 6 ft away, feeds for a moment, to nest u.r., sqwks, to branch, A out, away. B to nest, in, out with feces to sda, flycatches, perches x-wise, across to other side of meadow 30 yds away. 9:33 - B back to nest, u.r., in

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June 9 (cont'd.) out with feces to s.d.a. Flycatches, across meadow. 9:38 - A to nest, u.r., out to asp 6 ft away, flycatches, to s.d.a., away across meadow 9:40. I leave.

9:45 - At nest #6. 9:46 D>n to nest sqwks - d. out, D>n looks in several times, is attacked by House Wren which has nest 1 ft below. D>n away a few feet, then back, several looks in, in. Wren flies at hole angrily. Perhaps the wren is unable to distinguish the two holes with certainty. 9:52 - D to nest, sqwks, D>n out, d looks in, in; with food. The trees are thick enough around here to prevent my seeing where the birds go on leaving. 9:55 D. out, flycatching within 20 yds, back to nest, in. 10:01 - Saps, screams once; Flickers + Hairies noisy. 10:04 - D>n to nest, sqwks, d. out, d>n looks in 4 times, goes in with food, out again. 10:08 - Saps. flycatching around bases of asps. 10:11 - d. to nest with food; looks in, struck by wren, goes in, again hit by wren. 10:14 - D. must have slipped out - now back to nest, one sqwk, in, out. 10:15 D>n to nest with food, looks in several times, in. 10:16 D. to nest, sqwks

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June 9 (cont'd.) d>n out, d looks in, in,
then out again. 10:20 - bird to nest,
struck by wren as it goes in. 10:24
d>n to nest, silent, d. out, d>n looks
in thrice, in with food. 10:32 - d. to
nest, sqwks, d>n out, d. in. 10:34
D. out with feces to small pine, drops it.
10:36, bird back to nest, in. 10:42 - bird
out with feces to same pine 15 yds
away, drops them. 10:50 - d>n to
nest, looks in 5 times, goes in. 10:55^{sqwks}
D. to workings on asp 15 yds away, to
nest, sqwks, d>n out, d. in. 10:57 - d.
out with feces to same pine, drops them.
10:59 - bird to nest, looks in, in. 11:00 - out
with feces to same pine, drops them. 11:01
- saps. flycatching + feeding around low in
asps within 40 yds of nest. 11:03 - bird (d.)
to nest, looks in, in. 11:08 - d>n to nest,
d. out, d>n looks in 5 times, in. 11:15
d. to nest, sqwks, d>n out, d. looks in, in.
Wren flies at d's disappearing tail tip.
12:40 - at #7 - 12:46 D>n to nest - sqwks -
many looks in + sqwks - d. out, d>n in.
12:54 - N to nest, sqwks, several attempts to
get in, once almost all in, backs out, more bats,
squeezes in. 12:55 - sqwks, n. out, by nest,
goes back in. 1:04 - D. to nest from

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June 9 (cont'd.) across meadow with food; sqwks, n. out, then d>n. out, d. in. 1:09 - d>n to nest with food; sqwks - d. out, d>n looks in several times, goes in. As in other cases, the food looks like insects, dark, held in beak close to gape. 1:25 - N. to near nest, sqwks, to nest, sqwks - bird out, n. looks in, goes in. There may have been another exchange between 1:09 and 1:25 - I dozed a little. I think n. had food, but could not be sure. 1:30 - d. to nest, sqwks, n. out, d. aside, back to nest, looks in, goes in. Now d>n to nest, many looks in + sqwks., d. out, below nest, d>n. in. D. to branch by nest, back to nest, many sqwks, looks in. D. to asp 5 ft away, back to nest and around it, sqwks + looks in, goes in 1:34. 1:35 D. out again, back in, out again, back with sqwks, d>n out, d. in. 1:37 - n. to nest, d>n near nest. N. sqwks, d. out, n. aside, looks in, in. 1:39 - d>n. from thicket by creek. to asp 5 ft from nest, to dead asp, to nest, sqwks goes in. A bird comes out and flies across the meadow. 1:51 - N. to dead asp with a sqwk. - has food - to nest, sqwks, 8-10 looks in, to branch back, more looks, squeezes in. 2:00 P.M. D. to asp 5 ft from nest, to branch by nest, sqwk, n. out, d. to nest, d>n. now out; d. looks in, in. Sounds of tapping seem to be from in nest.

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June 9 (cont'd.) N. taps vigorously on dead asp to nest at 2:03, sqwks, d. out, n. in. 2:11-d>n to nest, sqwks, n. out, d>n in. 2:27-d. to asp 5 ft from nest, to nest, sqwks, d. to branch as d>n comes out; d. to nest, looks in, in. N. to asp 5 ft away, sqwks-2:33 To branch by nest, sqwks; d. out, n. to nest with food, looks in twice, goes in. During this observation period most activity is on the nest side of the meadow - all, unless otherwise mentioned. 2:35 - d>n to asp 5 ft away with food - to nest, sqwks, n. out, d>n looks in, in. 2:40 - n. to beside nest, sqwks; to nest, sqwks - d. up to branch by nest; n. yields place to d.; d. looks in, goes in. More sqwks - d. comes out, goes to asp 5 ft away, by d>n., who is there. N. from thicket by creek to nest, in. I leave, so does d>n. Just before I go, a bird comes out, I think with feces, goes to small pine 12 yds away, then back to nest, in.

June 10 - 6:13 A.M. At #7 - 6:15 - N. to nest with food - sqwks, looks in - now d. to branch by nest, also with food, more sqwks. D. to nest, n. aside - sqwks, looks in - n. to nest, d. aside, still no entrance; d. to asp 6 ft away; n. makes several attempts, squeezes in. D. back to nest, sqwks, n. out, d.

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June 10 (cont'd.) squeezes in. Presumably d > n. is in the nest taking up most of the room. D. and n. did not seem aggressive towards each other. 6:23 D. seems to have come out to below nest, hitches back up, goes in silently, out again, to dead asp, taps, preens. 6:28 - N. to nest from creek thicket with food; sqwks, makes numerous attempts to squeeze in, finally does, getting the last of his tail in with difficulty. Could d > n. have unhatched eggs that she(?) is unwilling to leave? 6:38 - D. to branch beside nest, sqwks, n. out, to dead asp, d. in. 6:42 - D. out, to dead asp. D > n now out, I believe with feces, over to small pine, 12 yds away. D. back to nest, in. 6:48 - N. to nest from creek thicket - sqwks - d. out, n. in. 6:53 - N. definitely to asp 6 ft from nest, to branch by nest - sqwks, d > n looks out, draws back in. N. to nest, sqwks, d > n. out, n. in with food. Loud sqwks - d > n. goes chasing d. around within a radius of 30 yds. A tattoo heard from some other bird 40 yds away. More sqwks, pursuit. 6:55 - D. to nest, sqwks, n. out, d. pauses below nest, to nest, in. 7:00 A.M. - D > n to nest from small pine 60 yds. across meadow, sqwks, d. out, d > n. in. 7:01 - N. to nest with food, sqwks, to branch beside nest, back to nest, sqwks,

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June 10 (cont'd.) several looks in, squeezes in. 7:02
N. out, right by nest, back in again. when
n. does this, he comes out head first, hangs
on to the nest-hole rim with one foot, pivots
to his left, in a semi-circle, so that he comes
right-side-up just below the nest. 7:07- a
new bird, an n>d., comes up 15 yds away,
taps, over to nest tree, sqwks, looks in
holes below nest, more sqwks — d>n looks
out, immediately comes out and drives
the stranger away — both go out of sight.
7:09- loud sqwks across meadow. 7:14-
d>n must have come back in; N. to nest,
sqwks, to branch by nest, to nest, sqwks. D.
to asp 5ft away, with beak full of food.
D. to branch by nest, sqwks, ~~d to nest~~, n.
~~aside~~. D>n comes out, ~~d in~~. N. in. D.
to nest, sqwks, n. out slowly, something in
beak. D. in with food, n. to below nest,
eats what it had. 7:16- N. to nest, in.
Now a bird, I am not sure which, leaves
nest area. Must have been d.; 7:20, d. to
nest with food, sqwks, n. out to dead asp
d. in. 7:28- N. to nest, sqwks, d. out, n. in.
Now d>n. comes from across meadow, to nest
with food, (I think), sqwks, n. out, d>n looks
in several times, squeezes in. 7:38- d. to nest
with food, sqwks, several looks in, in. Now

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June 10 (cont'd.) out again, back, sqwks, in. Now
n. to nest with food, sqwks, d. out, n. squeezes
in. D. back, sqwks, n. out with something
(feces?) in beak, to asp 10 yds away, whets bill.
D. in and out several more times, some sqwks,
back in, I think, at 7:38, 7:40 - n. from thicket
by creek to below nest with food, sqwks, to
asp 5 yds away, back to nest, sqwks, a bird
comes out, n. goes in. 7:48 - n. out, to dead
asp, taps, across meadow. 7:51 - sqwks from
across meadow; 7:52 d. below nest, taps.
7:54 - d. to nest, sqwks, d>n out, d. in, with
food. Once again I hear tapping that seems to
come from within the nest hole, 7:58 - d>n to nest
with food; sqwks, d. out, d>n in. As is usual
this morning, it is several seconds before the
entering bird's tail disappears from sight. 8:01 -
n. to branch by nest, with food, to nest, sqwks,
several looks in, in. 8:09 - n. out, to dead asp.
preens. 8:11 - d. to nest with food; sqwks, d>n.
out, d. in. N. goes to creek thicket. 8:15 - d>n
to nest, sqwks, d. out with feces to pine 12 yds
away. D>n. in., d. away across meadow.
8:21 - n. to branch by nest, to nest with food; sqwks,
d>n out, n. in slowly. 8:22 - d>n to nest, sqwks,
n. out, d>n in. 8:24 - d>n out with feces to
pine 12 yds away. 8:26 - I see a saps feeding in
small pines across meadow 60-75 yds away.

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June 10 (cont'd.) 8:31 - N. and d. both to nest with food; loud sqwks - n. to nest first, looks in several times, away to side; d. comes up, looks in, aside, n. back, goes in, d. to nest, sqwks, n. out, ~~d.~~ in d. sqwks, d>n comes out, d. in. ~~#~~ I got a little confused here, but d. is in at 8:34.

I think there was one more exchange of places.

Two magpies came by noisily and seemed to be ignored. 8:36 - N. to branch by nest, to nest, sqwks, d. out, n. in. 8:38 - D>n to nest,

with food, sqwks, looks in, n. out, d>n in. 8:47 -

D from across meadow with food; perches x-wise on branch by nest, to nest, silent, in; out again, below nest, back to nest, ^{sqwks,} in; now n. to nest, sqwks,

d. out, n. continues to look in; sqwks, n. in. Then d. to nest, n. out, sqwks, d. in. D. out again,

back in. D>n may have come out here some-time, probably did. These exchanges are hard

to follow. 8:53 - d. out again, back in. Loud tapping from in(?) nest. 8:56 - n. in thicket, seems

to have been bathing; now to dead asp by nest.

9:01 - d. out to dead asp, taps, preens. 9:03 - d. away to pine 30 yds from nest, on nest side of meadow.

9:07 - n. to branch by nest - sqwk - to nest with food, sqwks, d>n out, n. in. 9:09 -

^{d.}bird to nest, sqwks, n. out, ^{d.}bird in. Can't tell which one. 9:12 - it was d. D>n to nest with

food, sqwks, d. out, d>n looks in, in. I leave, 9:13.



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June 10 (cont'd.). As I was returning from nest #7 - I must have been about $\frac{1}{4}$ mi. away - I came upon a d>n. feeding around fresh workings in a mountain mahogany. After a few minutes, it flew off in the general direction of nest #7. This may have been the d>n of #7.

1:28 - at ~~#~~3. - 1:30 - both to nest, with sqwks, one leaves other goes in, out, screams. A returns, in, out, young audible; bird again to nest, u.r., in, out. - This is happening fast. 1:37 - B to nest, u.r., in, out, flycatches to asp 6 ft away, away across meadow. 1:41 - A to nest, u.r. with food, out, to branch by nest, screams 5 times, to asp 6 ft away, feeds, away. 1:42 - B to nest u.r. with food; mostly in, backs out, away. 1:45 A to nest u.r., in, out to branch by nest, away to nest side of meadow. 1:50 - B to nest u.r., in, out, away across meadow. Young audible, as usual. The birds have food each time, too. 1:53 - A to nest u.r., in, out, across meadow. 1:54 - B in, out with feces to sda, away to "this" side of meadow (= opposite from "across the meadow"). 1:56 - A to nest direct, in for a moment, out with beak full of wood chips, to sda, drops them, to asp 6 ft away, feeds. 2:02 - B to nest directly, in, out, away, flycatching over meadow. Young very noisy.

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June 10 (cont'd.) - 2:04 - B to nest u.r., not in, away about meadow again. Young still chattering.
2:05 - A to nest u.r., in, out to asp 6 ft away, flycatches, to asp 20 yds away, off. 2:06
B to nest u.r., in, out, away to this side of meadow. 2:08 - A to nest u.r., in, out, away.
2:12 - B to nest u.r., in, out, to branch by nest, away.
2:19 - A to nest u.r., sqwks, in, out, away to this side of meadow. 2:20 - B direct to nest from this side " " , in, out, across meadow, flycatching.
2:27 - A to nest u.r., in, out, away to this side of meadow. 2:34 - B direct to nest, in, out to branch, to nest again - in or away, I think the latter. 2:39 - A to asp 6 ft from nest, away, back to nest directly with food as usual, in, out with feces, to s.d.a., away 2:40 B to nest u.r., in, out to ~~nest~~ asp 6 ft away, feeds on sap, away. 2:42 - A to nest from this side of meadow, u.r., in, out with feces to s.d.a., away across meadow. 2:46 - B to nest directly from this side of meadow, in, out, back to nest from asp 6 ft away u.r., in. 2:48 - out with feces to s.d.a., flycatches several times around s.d.a., away across meadow. 2:52 - A to nest directly, in, out screaming ^{on wing}. Young very noisy. 2:55 - B to nest from across meadow, in, out, away this side of meadow. 2:59 - A to nest directly, in, out to branch by nest, whets bill. Then away to asps 15 yds off.

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June 10 (cont'd.) 3:01 - B to nest u.r., in. Loud
cries from 'young, 3:05 - B. out, to asp 6 ft
away, bill gaping, must be panting. Then to
s.d.a, preens. 3:07 - B flycatches, out across
meadow. 3:08 - A to nest directly, in, out, across
meadow flycatching. 3:13 - B to nest u.r. in,
out to asp 6 ft away, to branch by nest. A to
nest direct now, ^{saps,} B away to this side of meadow
A in, out, ~~away~~ to below nest, taps. 3:16 -
to asp 6 ft away, drinks sap. 3:17 - B to nest,
u.r., in, out, 10 yds away. A saps, is flycatching
in the meadow, now away to this side of meadow.
3:20 - A to nest from this side meadow directly,
in, out, away. 3:27 - B to nest, u.r., in. A to
nest directly, in; silent. One out, then other
out, both away to this side of meadow. I
leave.

It seems from these observations that there is
no slackening of activity even during the hottest
part of the day — and it was hot. The parents
visited the nest every 7 minutes at the most,
frequently with only 1 or 2 minutes between visits.
It is noteworthy that in all cases observed thus
far that nest sanitation follows a strict routine
pathway if not time. When a bird carries feces
out of the nest, it always goes to the same tree
and drops them; apparently this is true of
both birds, not just one. The other pairs show
identical behavior.



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June 11 — 6:45 A.M. — at #1. 6:48 — n>d to nest, in, out, away to west. Young audible 30 yds away. 6:49 — d. to nest, in, out at 6:50, to pine 10 yds away, taps, preens. Steller Jay screams close by — same tree. 6:51 — n>d to nest, d. leaves; n>d screams several times, beak full of food, looks in twice, goes in. 7:01 — d. arrives from east with beakful; silent; n>d leaves to west; d. in, out again 15 yds away. 7:06 — d. away to west. 7:07 n>d to nest, looks in, in, out to NW. 7:13 — d. to E. side nest from N.; to nest, in, with food as usual — insects. D. out with wood chips, to usual tree, shakes them out. 7:14 n>d to nest from W. with insects; in, looks out, back in. Young clearly audible, chattering. 7:27 — d. to E side nest from W., sawks, n>d out, away to west, d. in. 7:28 — d. out with wood chips to usual tree. 7:30 — d. back to nest, in, out to asps 10-15 yds away, flycatches. 7:31 — n>d. to E. side nest, to nest, looks in, in, out, away to W. Food is brought each time, and I will not mention it unless noteworthy. 7:32 d. to E. side nest, to nest, in, out, back to E side nest, in, out with feces to usual tree, back to E. side nest, in. 7:35, out again. 7:38 n>d to asp 6 yds away with a sqwk.; to E side nest, to nest, looks in, in, out, away to W.

too oily (next page)

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June 11 (cont'd.) 7:41 A.M. - n>d to E of nest, to nest, in, looks out, draws back in. Now d. to E side nest, to nest, in. Both in now. N>d. comes out away to W. D. looks out, pulls back in. At nest #3 yesterday both birds were in the nest for a moment; this is frequent, of course, at #7 where 3 birds are involved.

7:53 - n>d to E side nest, to nest, looks in, in, out again, away to W. (it came from W.) I did not see d. leave, but d. may have slipped out - I suspect so. 7:56 - n>d to E.

side nest, to nest, looks in, in, out, away to W.

8:05 - d. to E side nest from W.; to nest, in, out with big gob of feces + wood chips, to usual tree - an asp 15 yds away, - discards it. 8:09 -

Bird - I believe n>d, - to nest (E side) from W., in, out, away to W. Now d. to E side nest, to nest, in, out with wood chips to usual tree, discards them. 8:11 - bird to nest, in, out, away. Unless the birds go to the nest in some way other than to the E. side of it first, I will simply note "to nest".

8:14 - n>d to nest, looks in, in, out - to S. where d. is working around, 20 yds from nest. Squks.

8:16 - d. to nest, in, out with wood chips to usual tree. 8:17 - n>d to nest, in, out, off

to W. As with all the nests, there are quite a few flies around the nest hole. 8:21 - n>d

to nest from N., ^{looks in,} in about 30 sec., out. 8:22 - d. to nest, in, out with debris dropped in flight.

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June 11 (cont'd.) which is unusual. D. in asps within 20 yds N. of nest. 8:26 - n>d to nest from W, ^{looks in twice,} in, out, off to W. 8:29 - n>d to nest, from W, looks in, in, off to W. 8:33 - d. appears near nest, off to E. 8:37 - d. to nest, in, - from N. 8:39 - d>n to nest direct from N.; d. out, d>n in. 8:53 - d. to nest, in, out with feces to usual tree; flycatches, perches on fence post; 8:55 - to nest, away within 10-15 yds, continues flycatching. 8:57 - n>d to nest, pauses, in, out, away to E. 8:59 - d. to nest from west, in, out with wood chips to usual tree. 9:01 - n>d to nest from W, in, out, to asp 5 yds off, away. 9:07 - n>d to nest, looks in, in, out to pine 10 yds to N., off to NW. 9:10 - n>d to nest, in; a Chestnut-backed Bluebird follows, flutters at hole. N>d. out. Bluebird above nest. D. to nest from W, 9:11, in, out to usual tree with wood chips. 9:13 - N>d to nest from W, in, out to NE. 9:15 - bird ^{d.} to nest from N., in, out 9:16 to usual tree with debris; to fence post; flycatches; away at least 100 yds to N. 9:19 - d. to nest from N., in. 9:20 - d. out, to pine 6 yds away, away to W. 9:25 - d. to nest, pause, in, out with feces to usual tree. 9:26 - n>d to nest from W, in, out, to small pine 100 yds to N. 9:28 - n>d to nest from W, in, out, away to W. 9:30 - n>d to nest from W, in, out, off to W. 9:33 - d. to nest from W, followed immediately by d>n. ^{sqwks.} D>n in, out, off to W. D. in, then out to usual tree with wood chips. 9:36 n>d to nest, looks in, in, out, away to west. 9:37 - d. to nest, in. 9:38, out to tree 10 yds away back, in. 9:39 - d>n to nest, sqwk, goes in, out, away to S., flycatches; 9:40 d>n back to nest, in, out to S. again. 9:44 - d>n to nest from S., looks in, in, out to N. 100 yds to same small pine as before. I think d. slipped out at some time here, but for a while I am certain both birds were in together. 9:45 n>d to nest, in,

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Junell (cont'd.) out, off to N. again. I leave.

4:24^{P.M.} - A + #7. Saps. in creek thicket. 4:29 - d>n to branch by nest; d. up from thicket to nest, sqwks, n. out, d. in., d>n to "usual" pine. d>n now to nest, sqwks, d. out, d>n in. Both had food.

4:31 d. to nest, sqwks, d>n out, d. in. 4:38 - d. out, to asp 6 ft away.

4:38 - d. back to nest, in. 4:40 - d. out with feces to usual tree for disposal, back to nest, in. 4:41 d. out with feces to tree again - 4:42 n. to asp 6 ft from nest, sqwks, to nest; d. away across meadow; n. looks in, in. 4:43 - d>n to nest, sqwks, n. out, d>n in. 4:48 - d. from meadow to branch by nest, perches x-wise, sqwks, d>n out, d. to nest, 2 looks in, goes in. 4:50 - n. to branch by nest from thicket, sqwks, d. out, n. to nest, in. The birds bring food each time.

D. 20 yds away, in small pine. 4:55 - d>n to nest, sqwks, n. out, d>n in - almost. D. to nest, sqwks, hops around near it. D>n. out again, still with food, d. to nest, in. 4:58 - d>n to nest, sqwks, d. out, d>n in. 5:07 - d. to nest, sqwks, d>n out, d. in. 5:08 - n. to nest, sqwks, d. out, n. in. D. to thicket, screams several times. 5:14 d. from thicket to nest, sqwks, n. out, d. in. Food, as usual. 5:15 - d>n. to nest, sqwks, d. out, d>n in. 5:16 d>n out, apparently with debris in bill, to pine 10 yds away - not usual disposal tree. 5:18 - n. to nest, sqwks, 2 looks in, in. 5:22 - d. to nest, sqwks, n. out, d. in. 5:24 - d. out, with debris I think, to disposal tree. Back to nest, in. 5:29 d. out, to asp 6 ft away - bill gaping as though hot. D>n to nest, sqwks, goes in. D. away across meadow, 5:30^{P.M.} I leave.

June 12 - 7:10 A.M. - at #3. 7:11 - A to nest u.r., in; 7:12 out, to asp 6 ft away. Now B to A's asp, sqwks, A across meadow, B away also, with sqwks. 7:14 A back to nest

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June 12 (cont'd.) U.R., in, out, away. 7:16. B to nest direct; in, out to asps 15 yds away. 7:18 - A direct to nest, in, out, away this side of meadow. 7:19 - A back to nest U.R., in. 7:20, out across meadow. 7:25 - B to asp 6 ft away, feeds, to branch by nest; A arrives direct to nest, sqwks, in. B away to this side of meadow, tattoos. A out to branch by nest, away across meadow. B continues tattoos. 7:30 - A to ~~asp~~ asp 6 ft from nest, to nest, 2 screams, 2 looks in, in, out to asp 6 ft away. B to nest direct, sqwks, in, out with feces to s.d.a. A to nest, in, out with feces to s.d.a. One or both birds away, 7:33. 7:34 - It was one away, one in. B out with feces to s.d.a., then away up meadow, past #6. 7:36 - both to branch by nest simultaneously, sqwks, ^A ~~one~~ to nest, in; B to asp 6 ft away; A out with feces to s.d.a., B direct to nest, in. A away across meadow. Both arrived from different directions at 7:36. 7:42 - A to nest U.R., sqwks, B out; A in. B away to asp 6 ft off, then away this side of meadow. 7:55 - B to branch by nest, sqwks, A looks out, sqwks, comes out. B to nest, in, out to asp 6 ft away, back to nest, in, out, below nest, to tinypine at base of nest tree, preens. 8:00 A.M. Tattoo in distance. B flycatches, feeds around bases of asps 15 yds off. Back to asp 6 ft away, feeds, to nest direct 8:02, in, out, back to asp 6 ft away, feeds away this side of meadow. 8:03 - A to nest U.R., in, out to branch by nest; B to branch with sqwk., A to asp 6 ft off, B to nest, in, out. A away this side of meadow. 8:07 - A to nest direct, in, out, away, ^{to below nest.} Now B to nest U.R., sqwks, to nest, in, out, away. 8:15 A to nest U.R., in, out, away this side meadow, from whence A came. Frequently the birds cross the meadow without stopping at the nest.

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June 12 (cont'd.) - 8:20 - B to asps 15 yds away, to asp 6 ft away, hitches along tree to catch running insect, to nest u.r., squks A out, B in, out, away across meadow. A had slipped in without my seeing it. 8:24 - A to nest u.r., in, out to asp 6 ft away. Young noisy. A taps, preens. To s.d.a. back to asp 6 ft away, feeds momentarily, off across meadow. 8:31 - B to nest u.r., in, out, to branch by nest, whets bill, to asp 6 ft away, feeds, to base of nest tree, to ground, to asp 6 ft away. Tattoo in distance. 8:33 - A to nest u.r., squks, in, out to asp 6 ft away, squks, one leaves, say B, A back to nest u.r., in, out with feces to s.d.a., to base of nest tree, to asp 6 ft away, feeds, works around asps 10-15 yds away, chased by Bluebird near its nest, back to tiny pine at base of nest tree. 8:36 - B to nest u.r., squks, in, A away, B out, away. 8:39 - A to nest direct, in, out to branch by nest, flycatches, away across meadow. Young noisy. 8:42 - B to asp 6 ft off, to nest direct, in, out, to asp 6 ft off. 8:43 - A to nest direct, squks, B away this side of meadow, A in, out with feces to s.d.a. 8:47 - B to nest direct, in, out. Now A to nest direct, in. B at base of asp 6 ft off, now 15 yds off. 8:50 - B to nest u.r., squks B to branch by nest as A comes out, B to nest, in. 8:56 A to nest direct, squks, B out, A in, out with feces to asp 6 ft away instead of s.d.a. Taps + feeds. Back to nest u.r., in. 9:01 - B to branch by nest, squk, to nest, to branch as A comes out to asp 6 ft off; B to nest, in, out to just below A in asp; squks; A leaves; B to base of nest tree, -chases chipmunk to ground which had started up. Taps. 9:05. B back to nest, in, out with feces to s.d.a., back to nest u.r., in. 9:09 - A to nest u.r., squks, to branch as B comes out, back to nest, in. B flycatches over meadow, 9:10. I leave.

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June 12 (cont'd.) - There seems to be little deviation in the pattern of care of young in any of the pairs. All during the day food is brought at least every 10 minutes, usually every 7, or oftener. There are no apparent slack or hyperactive periods. Possibly nest sanitation is carried out largely by one of the pair, perhaps the ♀. More or less stereotyped behavior and pathways to the nest are the rule. Much flycatching is done. The watching is extremely boring as there is so little variation of activity.

June 13 9:37 - At #1 - n>d to nest from W., in, out, to asp 5 yds away, off to E. 9:42 - d. to nest from N., in; n>d to nest, sqwk., d. out, n>d looks in, goes in, out to fence post 10 yds off, away to N. Young audible. 9:45 n>d to nest from N., looks in, in, out, off to W.

9:51 - d. to nest from W., in, noise from young, out with wood chips to usual tree, back to nest, in, out with chips again to tree half way between nest and usual one; sits. 9:54 - n>d. to where d is; sqwks, d. off to W., n>d to nest, in, out, off to W.

9:56 - d. to nest from W., in, out with feces to half-way tree, flycatches, to asp 10 yds off, flycatches closer to nest, to nest, in 9:57, Now n>d to nest, sqwk, d. out to N., n>d in, out to N. also. 10:00 A.M. d. to nest from W., in, out with feces + wood chips to usual tree, flycatches, ^{n>d} back to nest, in, out, off to N., back to nest, in, out as d. comes up from W., sqwk, n>d away, d. in, out, to asps + fence post 10 yds off. 10:08 - n>d to nest from W., in, out, off to W. 10:09 - d. to nest from NW, in, out with debris (feces + wood chips) to usual tree, disposes of it with shakings of the head as always. 10:12 - n>d to nest, in, out, off to N. 10:16 - n>d to nest from W., in, out, off to W. Cheeping of young constantly audible.

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June 13, (cont'd.) 10:18 - bird was in, out, off to W. 10:20 - d. to nest from N, in, out with debris to half way tree, flycatches. 10:21 n>d to nest from W., in, out, off to NW. D. back to nest, in, out, flycatches. 10:26 - d. to nest, followed immediately by n>d. Squaks. D. remains aside, n>d to nest, in, out, off to W.; now d. to nest, in. D. always remains in longer than n>d, presumably carrying on nest sanitation, ⁱⁿ which n>d has not yet been observed. 10:29 - d. out, off to W. 10:32 n>d. to nest from W., in, looks out, draws back, out, off to N. 10:35 n>d to nest from W., in, out, off to N. 10:37 - n>d to nest from W., in, out, off to N. 10:38 - Exact repeat on n>d. 10:41 - d. to nest from W., in, out with big hunk of debris to usual tree. Then n>d. to nest from W., in, out, off to N. 10:43 d. around flycatching from fence post to fence post. 10:45 - d. (I think) to nest from W., in, out, off to N. 10:45.5 - d. (for sure) to nest from W., in, out with debris to usual tree. 10:47 - n>d to nest from W., in, out, off to N. 10:50 - exact repeat, n>d. 10:51 - same, but off to W. 10:54 - d. to nest from W., in, out with debris to half-way tree. Flycatches around fence, which is about 10 yds to N. 10:56 n>d to nest from W., in; d. off to W.; n>d out, to N. 10:57 d. to nest, in, out with debris to half-way tree, flycatches. 11:00 - n>d to nest from W., looks in, out, off to N. 11:02 - repeat, but no look in. 11:03 - adult Goshawk flies by. 11:05 Bird to nest from N., in, out to N. 11:07 - n>d to nest from NW, in, out to N. I go to the nest and look in at the young, which are about 10 days old. Their eyes are not yet open, but unopened pinfeathers are showing on all the tracts that I could see.

At about 4:30, on my way to #1, I passed a

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June 13 (cont'd.) daggetti strongly > nuchalis up in a yellow pine. I frequently see these birds in the woods, but am unable to follow them. This one flew off toward the ranger station.

3:47 P.M. - At #7 - d at nest, sqwks, goes in; n. to nest, sqwks, d. out to usual tree with feces, n. in. 3:49 - d. to nest, sqwks, n. out, d. in. 3:50 d. out, flycatches around bases of trees. Young noisy. D. back in. 3:52 d. out with feces to usual tree, then away up meadow. 3:55 d>n to nest, looks in, in, out with feces to usual tree - n. to nest sqwk, looks in, in, out again to 10 yds away - I did not see if he cleaned nest 3:57 d. to nest, ^{sqwks,} looks in, in. All birds bring food. 3:58 d. out with feces to usual tree (I will refer to this pattern henceforth as "cleans nest") D. back below nest, taps. Young chattering. 3:59 d. back to nest, in. 4:00 P.M. d>n to nest, sqwks, d out, d>n in, out, back to base of nest tree. N. to branch by nest, perches x-wise, sqwks, down to near d>n; they sqwk to each other, crown feathers up. N. to nest, looks in, in, 4:03. 4:05 - d>n to branch, x-wise to nest, sqwks, n. out, d>n in. 4:10 - d. to branch, x-wise, to nest, sqwks, d>n out, d. looks in, in. 4:11 d. cleans nest. The young are noisy after a bird looks in or leaves. D. back below nest, taps, to nest, in. 4:13 - n. to nest, sqwks, d. out to thicket, n. goes in. 4:17 - d. to branch by nest, x-wise, to nest, looks in, n. out, d. in. Silent. 4:18 d cleans nest. 4:19 d. back, in. Cleans nest again.

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June 13 (cont'd.) 4:20 - d. back, in. Cleans nest, back, in. Cleans nest; back below nest, taps, in. Cleans nest, back, in. 4:23 - n. to nest, sqwks, d. out, n. in. 4:27 - n. out, down to thicket. 4:32 d>n to nest, looks in, in. 4:33 d. to nest, looks in, sqwks, d>n out with eggshell, d. in. 4:34 d>n to below nest; away across meadow. 4:39 d. out to asp 6 ft away, taps, preens. 4:40 - n. to just below d., sqwks, d. leaves, n. to nest, in. 4:43 - d>n to nest, looks in, sqwks, n. out, d>n in. 4:50 d. to nest, sqwks, aside, d>n out, to below nest, d. in. D>n feeds. 4:52 - n. to branch by nest, sqwks, d. out, to pine 6 ft away. N. in, d>n over to d., sqwks, d>n to nest, sqwks, d. away, n. out, away, d>n looks in, goes in. - probably came out. 4:59 d. to nest, looks in, in, out, flycatches nearby. 5:00 to meadow thicket, back to nest; d>n from across meadow, sqwks, d. in nest, d>n below. 5:02 d. out; d>n up to nest, in. 5:06 - n. to beside nest, sqwks, d>n looks out, withdraws, sqwks, d>n out, below nest. n. looks in, in. 5:08 d. from meadow to branch by nest, x-wise, sqwks, to nest, n. out, d. in. D>n taps below, flycatches. 5:13 d>n, n., both to beside nest, sqwks, d. out, d>n to nest, in, n. to nest, sqwks, d>n out, n. in. Tapping from within nest. 5:21 d>n to nest, sqwks, n. out, d>n in. 5:26 d. to ^{branch by, x-wise,} nest sqwks, aside, d>n out, d. to nest, sqwk, in. D. cleans nest, back in; d>n feeds below. D>n to several nearby trees, gathers food. D. out. 5:32 - d>n to nest in. 5:33 - n. to nest, sqwks, d>n out, d. to nest, n. in, d. sqwks, n. out, d. in; d. cleans nest, back in. 5:35 d. out again, to pines 5 yds off, back in. Out again.

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June 13 (cont'd.) - seems to be cleaning nest, back in.

out again, flycatching, gathers food; back in. 5:37
n. to nest sqwks, aside, d. out, n. in. 5:39 - d>n to
nest, sqwks, n. out, off across meadow, d>n in. 5:42
d. from across meadow - I can see insect wings in its
beak; to nest looks in, aside, back to nest, sqwks,
d>n out, d. in. 5:43^{P.M.} - d. cleans nest; I leave.

June 15 - 1:55 P.M. At #7 - sqwks, d. to nest, in.

Young audible. 1:58 - d. out to pine 5 yds away, bill
gaping. Now down to creek thicket. 2:01 - d. to nest,
in. D>n to nest, looks in, sqwk, d. out with beakful
of wood chips, to pine by usual one; d>n in, then
out, to pine 5 yds away, preens. D. away. 2:05 -
n. to beside nest, sqwks, to nest, 2 looks in, in,
out with debris to pine 10 yds away (not the one
usually used by d.), away. 2:09 - d. must have
slipped in, as d. just came off the nest. 2:10 -
d>n to nest, in. 2:11 - n. to nest, in; is d>n out?
2:12 - d. to nest, looks in, sqwk, a bird out, away,
d. in. 2:13 d. out, back again. 2:14 d. cleans nest
back in. 2:18 - d>n to branch by nest - faint sqwks -
d. out, d>n to nest, in. 2:24 - n. to beside nest,
d.>n. to nest, much sqwks, d>n in, n. to nest,
sqwks, d>n. out, n. in, then out. Both off in opp-
osite directions. 2:30 - d>n back to nest, in, out, below
nest. N. to nest with sqwks - d>n off, n. in. 2:35 -
n. out to a pine 5 yds away, then to creek thicket.
2:36 - d. to nest, in, out with debris (mostly wood
chips) to pine 7 yds off, not usual one, but one used
previously; back to nest, in. - next page -

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June 15 (cont'd.) - 2:38 - d>n to nest, looks in, sqwks, d. out,
d>n in, out, to below nest, to branch, x-wise, away.
2:41 - d>n to nest, in, out to "usual" pine, preens. 2:42
N. to nest, sqwks, in; d>n. off across meadow, d. n.
out, off same way. 2:47 d. to branch by nest, perches
x-wise, to nest, in. 2:50 - d. out, to asp 6 ft away, preens.
2:51 d>n to usual pine, sqwks, to nest, in; n. to branch by
nest, sqwks, d>n out, n. looks in, in. D>n. taps close by.
2:56 - n. out, to pine usually occupied by d>n., taps. 3:00 P.M.
I leave; stock drive coming by.

June 16 - 11:00 A.M. At #3 - A to nest, u.r., screams quite
a bit, seems to be bothered by me; away, to nest again,
in, out, nearby, screams. 11:02 - B to ~~nest~~ where A is, sqwks,
to nest u.r., in; A away across meadow; B out, away.
11:04 - One saps. flies over nest; other, say A, to nest u.r.,
screams, in, out to branch by nest; 11:05 B to branch by
A, sqwks, A leaves to this side meadow, B to nest, in, out,
away across meadow - 11:05. The young are audible,
but seem to "cheep" instead of chatter as they did
earlier. These are 13 days old. 11:08 - B to nest direct,
from this side of meadow; 2 looks in, in, out to branch
by nest, away across meadow. 11:11 - Bird crosses meadow
to this side. 11:12 - A to nest direct, in, out to branch by
nest, to asp 6 ft away, feeds, flies at chipmunk above
nest, which goes in hole. A looks in hole, chases chipmunk
lethargically when it comes out. A back to asp, feeds.

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June 16. (cont'd.) - A. away to this side of meadow. 11:17 - B to nest u.r., in, out, to asp 6ft off; A to nest u.r., squats, B away, A in, out to branch by nest to asp 6ft off, away across meadow. 11:22 B to nest u.r., in, out, to branch by nest, to asp 6ft off, away to this side of meadow. 11:23 A to branch by nest; 30 sec. later to nest, in, out to asp 6ft off, to s.d.a., sits. 11:25 - B to asp 6ft off, to nest, screams, back to asp, to nest, in. B had a large winged insect, probably a dragon fly. B out, to branch by nest, whets bill. 11:30 - B away to this side of meadow. 11:33 - A to nest ^{from this side,} u.r., in, out to asp 6ft off; B to nest from across meadow, u.r., in; A off across meadow; B in, out, to asp 6ft off, sits, preens. 11:35 - B to s.d.a.; off. 11:37 - A to nest from across; u.r. in, out, off to this side. 11:42 - B to nest direct, from this side; in, out, to asp 6ft off, away to this side. 11:44 - A to nest from this side, u.r., in, out, to asp 6ft off, away to this side. 11:47 - B to nest direct from this side; in, out to branch by nest, away to this side. 11:51 - A to nest direct from this side, in, out, to branch by nest, to asp 6ft off, away to this side. 11:53 A to nest from this side, in; B to nest u.r. from across; A out, faint squats as both are on branch, A away to this side, B in, out to branch, away to this side too. 11:55 - A to nest u.r. in, out with feces to s.d.a., away across meadow. 12:00 - B to nest direct from this side; then to branch by nest, back to nest, screams, 2 looks in, in, out to s.d.a., away across meadow. I. leave.

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June 17 - 8:45 A.M. - at #7. 8:54 - d. to nest from thicket, 2 looks in, to branch by nest, flycatches, back to nest, aside, to below nest again, back to it, two looks in, in. 8:56 - n. to branch by nest, sqwks, d. out, to below nest, n. to nest, then aside to branch, perches x-wise, d. up to nest, looks in, in; n. to asp 6ft away, back to nest, sqwks, d. out, n. in; then follow two more exchanges with sqwks between d. and n. At 8:59, with d. in the asp 6ft off, n. beside the nest, d > n comes out, goes across meadow. N. in, d. to nest, sqwks, n. out, to thicket, d. in, 9:00 A.M. 9:04 - n. out of thicket to across meadow. 9:05 - n. to nest, ^{looks in,} sqwks, d. out, n. 2 looks in, goes in. [I may not always be sure about the sqwks; it is very windy today.] 9:06 - d > n to nest, sqwks, n. out, d > n in. 9:14 - d to nest, looks in, d > n out, d. in. d > n goes across meadow. 9:16 - n. to nest, sqwks, looks in, d. out, n. aside, n. to nest, 2 looks in, in. 9:20 d > n to nest, d. up beside nest on branch, x-wise. Much sqwking, n. out, d > n in; d to nest, looks in, away, off to thicket; d. back, to nest, in, out, to below nest, back to nest, in. 9:26 - d. out, to below nest, back up; d > n out, d. in. Silent. 9:29 - n. to branch by nest, to nest, sqwks, d. out, n. 2 looks in, goes in. Probably he feeds the young on these "looks." 9:36 - d > n to nest, sqwks, n. out, d > n in. 9:47 ^{37!} d. to nest, sqwks, d > n out, d. in. 9:50 ^{40!} - n. to branch by nest, sqwks, to nest, 3 looks in with sqwks, aside as d. out, n. 3 looks in, in. N. had given up the food in his beak after

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June 17 (cont'd.) the 3rd look. N. cleans nest, twice, to tree that d. went to when not the "usual" - a pine about 7 yds away. N. back to nest, directly in. 9:50 - d. to below nest, up to it, looks in, n. out, d. in. Silent. N. to thicket by creek. 9:56 - d. to nest, sqwks, d. out, d. in. 9:59 - n. to d. n's "usual pine," to nest, sqwks, aside as d. n comes out, n. feeds twice, goes in. 10:02 - d. to nest, n. out, d. in, slowly. Silent as far as I could tell. 10:05 - d. n to nest from clear across meadow; 2 looks in, sqwks, d. out, d. n in, slowly as usual. It is usual for d., too. 10:08 - n. to nest from thicket, looks in, sqwks, d. n out, n. bobs head in 5 times, presumably feeding, goes in. 10:10 - d. to nest, n. out, d. looks in, in. All silent; no wind. 10:14 - d. n to nest, 2 looks in, sqwks, aside as d. out, d. n in. 10:18 - n. to nest, sqwks, aside as d. n out, 2 fast looks in, no apparent feeding, in. 10:20 - ? d. n in asp by creek, ruffling feathers; seems to have been bathing. 10:22 d. to nest, looks in, n. out, d. in. Silent. D. cleans nest. 10:23 - d. n to nest, looks in, sqwks, aside as d. out, d. n in. D. to thicket. I think d. n was the bather. 10:26 - d. to nest, d. n out, d. in. Silent. 10:27 n. to branch by nest x-wise, sqwks, to nest, 2 looks in, in. Perhaps d. slipped out while I was writing. 10:32 - d. n nest, 3 looks in, sqwks, n. out, d. n in. In the thicket by the creek a saps. screams; it is a nuchalis, but not n.; of this I am certain. Probably it is the one mentioned in previous note on nest #7 - slight d. tendencies. 10:33 D. to nest, in, out, about it. Below nest, back up in.

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June 17 (cont'd.), out, in. All silent. 10:37, d. out/below, back to nest, sqwk,, d>n out, d. in. D>n seems to be something of a nest-hog. 10:38 - N. to nest, sqwks, d. out, n. bobs in, goes in. [The thicket, or creek thicket often referred to seems to be willows.]. 10:43 d>n to nest, sqwks, n. out, d>n in. 10:44 - d. to nest, 2 looks in, in. Silent. D. out, to below nest, looks in nest, around it perching x-wise, back to nest, sqwk,, in again 10:45. out, below nest, back, in. 10:48 - ~~I leave~~. D. out again, anxious. N. to branch by nest, x-wise. Sqwks. D. to nest, in. N. to nest, sqwks, d. out. N. away to branch, back, sqwks, d>n finally out, n. in. ^{Young very noisy; n. feeds several times.} 10:50. D. to nest, n. out, d. in. 10:51 - d. cleans nest, back in. 10:53 - I leave, as n. returns to nest, sqwks, d. out, n. in.

3:15 P.M. - at #1. D. to nest, in, out with debris, I think. 3:16 - n>d to nest, screams, perhaps because of me, 2 looks in, in, out to asp 5yds off. D. still nearby. N. off to west, d. to nest, in. The "cheeps" of the young are quite loud. D. out, away. 3:21 - n>d to nest from W., in, out, off to W. 3:22 - d. to nest from W., in, out, to big pine 15yds to S. 3:24 - n>d to nest, looks in, in, off to NE as it comes out. Now across to W. 3:25 - bird to nest from W., in, out, off to W. 3:29 - n>d + d. both within 10yds of nest; sqwks; n>d to nest, in, out, off to W.; d. to nest, in, stays about 1min., out to SE. 3:37 - d. to nest from W., in, out, off to E. 3:42 - n>d to nest, in, out, off to NE. [These directions are not strictly

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June 17 (cont'd.) accurate, but they show how the birds move out in all directions.] 3:44 - n>d back to nest, in, out, chases a Hairy in an asp 10 yds away. 3:45 - d to nest, in out, also chases hairy which remained nearby. No sounds; the Hairy retreated without any resistance. 3:47 - n>d to nest from W, in, out, off to W. 3:49 - d. to nest from W, in, out to asp 5 yds away, taps. Very loud cries from young. D. back, in, out, off to N. Again, very loud cries. 3:52 - d. to nest from W, in, out, to N., then off to S. 3:53 - n>d to nest, in, out, off to N. 3:56 d. to nest from W., in, out with feces to usual tree, off to S. 3:57 - n>d to nest from W., in, out. 3:58 - d. to nest from S., in, out, cleans nest. Flies around within 15 yds, off to W. 4:00 P.M. - d. to nest from W., in, cleans nest, out. 4:02 - n>d to nest from W., in, out, off to N. 4:06 - n>d to nest from W., in, out, off to W; now d. to nest, in, cleans nest, out; around to S., flycatching and going from tree to tree. 4:09 - d. to nest, in, cleans nest, out, back to nest, in, out, off to E. 4:11 - n>d to nest from W., in, out, off to W. 4:13 - d. to nest from W., in, out, seems to have debris in bill, to E, then to W. 4:15 - n>d to nest from W., in, out, off to N. I leave. Rain clouds coming up fast.

Back at Crowder Flat I heard a saps. tattooing, and watched the bird for 15 min. before I lost track. I doubt if this is a nesting bird, for the nesters are ^{almost} never away for more than 10 min.

June 18 - Rain. A brief visit to nest #3 showed

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June 18 (cont'd.) that both parents are still feeding the young every few minutes.

June 19 - Rain in the morning. 1:12 - skies clearing a bit - at #7. 1:14 - n. to nest, sqwks, d. out, n. bobs in, feeds, out; d>n. to nest, in; n. back to nest, sqwks, d>n out, away, n. feeds twice, in. Cries of young very loud, especially when a bird leaves. 1:17 - d>n to nest, sqwks, n. out, away, d>n in, out with debris to d's "usual" disposal tree. 1:20 d>n to nest, in, cleans nest. I have seen all three birds at this nest engage in nest sanitation. 1:23 - n. to nest, screams + sqwks, as he goes in, d>n to nest, sqwks, n. out, d>n in. 1:24 d. to nest, sqwks, d>n out, d. in. N. in thicket, back to nest 1:25, sqwks, d. out, n. in. D. to pines 15 yds away, right over my head, taps loudly. 1:27 d. to thicket. 1:29 - d. to nest, sqwk, n. out, d. in. 1:30 d>n to nest, sqwks, d. out, d>n in. 1:33 - young noisy - d. to nest, d>n out, d. in. silent exchange. D>n to thicket, then across meadow. 1:37 - n. to nest, sqwks, aside as d. out, feeds twice, does not go in, away to asp close by, then to thicket. Young highly vocal. 1:39 - n. to nest, feeds twice, back to thicket. 1:41 - n. to nest, feeds twice, away. Now d>n to nest, in. 1:42 n. to nest, sqwks, d>n out, n. in. 1:44 - d>n to nest, sqwks, n. out, d>n in. 1:47 - d. to nest, sqwks, d>n out, d. in. 1:48 - n. to nest, sqwks, d. out, n. feeds twice, away. 1:50 - n. to nest, feeds twice, away. 1:52 - n. + d. to nest from opposite directions; n. yields to d., d. goes in, n. away. Now d>n to nest, sqwks, d. out with debris to

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June 19 (cont'd.) usual tree, d>n. in. N. back to nest, sqwks, d>n. out, n. in. 2:01 - d. to nest, sqwks, n. out, d. in. D. cleans nest, back in. 2:05 - d. cleans nest, to alternate disposal tree, back in. 2:07 - d>n to nest, looks in, sqwks, d. out, d>n aside, to nest, in. 2:12 - n. to nest, sqwks, aside as d>n out, feeds once, away. Both d>n + n. to thicket, sqwks, n. up to pine, d>n up to pine also, sqwks, n. to nest, looks in, in 2:13. 2:15 d>n to nest, in, out; n. may have left. — yes. 2:16 d. to nest, in; n. to nest, sqwks, d. out, n. in. 2:17 d>n to nest, sqwks, n. out, d>n in. 2:20 - n. to nest, sqwks, d>n out, n. looks in, in. A visit to the nest by n. seems to result in louder sqwks — perhaps by him, or the bird being relieved. 2:22 ^{d to nest} n. out, down to thicket, d. in. 2:25 d>n to nest, sqwks, d. out, d>n in. 2:30 - n. to nest, sqwks, d>n out, n. 2 looks in, in, out; d. to nest, in, cleans nest, back in, out; n. to nest, feeds, away. 2:32 - n. to nest, feeds twice, away. 2:37 - d>n to nest, in; n. to nest, sqwks, d>n out, n. in; now n. out, away. 2:39 d. to nest, in. 2:42 d>n to nest, sqwks, d. out, d>n in. 2:44 - n. to nest, sqwks, aside, d>n out, n. feeds twice, away. 2:47 - n. to nest, sqwk, feeds twice, away. 2:48 - d to nest, in, cleans nest. Now n. to nest, feeds twice, away. 2:50 n. to nest from thicket, 2 feeds, away. 2:51 d>n to nest looks in, away, back, in, cleans nest to alternate tree; n. to nest, sqwking on wing, looks in, in. D>n to thicket. N. out, away. 2:54 - d. to nest, in, cleans nest to alternate tree, to thicket, screams. 2:57 - d. to nest, in.

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June 19 (cont'd.) 2:58 - n. to nest, sqwks, d. out, n. looks in, in.
Now d>n to nest, 2 looks in, sqwks, n. out, d>n in. 3:03 -
n. to nest, sqwks, d>n out, n. feeds twice, away. 3:05 -
d. to nest, in. 3:06 - n. to nest, sqwks, d. out, n. looks in, in.
3:09 - d>n to nest, looks in, aside, n. comes out with sqwks,
d>n goes in. 3:12 - d. to nest, aside, d>n out, d. to nest
in. Silent. I leave.

The behavior of n. at this nest is new in that she frequently did not go in the nest on ^{her} visits to it. N. would arrive at the nest with food, duck ^{her} head in and out once rather quickly, and then go about half-way inside for a few seconds, coming out with ~~out~~ food ^{no} longer in ^{her} bill. D. and d>n almost always go right in the nest and stay until relieved or until they decide to clean the nest. I have seen n. clean nest only once, and the others several times. Possibly d. and d>n are both ♀s. ^(d. is a ♂) At #1, only one bird has been noted cleaning nest, and at the other nests both birds, although probably one does most of it.

7:14 P.M. Back at #7 - sky clear. 7:17 - cries of young clearly audible. No sun in meadow; all very quiet; still quite light. 7:20 - n. to nest, sqwks, d. out, n. feeds, d>n flies up, seems to scare n. off; d>n goes in, cleans nest to alternate tree, back to nest, half in, off to usual disposal tree. Cries of young loud. 7:25 - d>n to nest, feeds several times, to below nest, picks debris off branch, to usual tree, back to nest, in. 7:27 d. to nest, sqwks, d>n out, d. in. — See next page —

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June 19 (int'd.) 7:28 - n. to nest, several sqwks, looks in, d. out, n. feeds twice, in. 7:32 - d. to nest, looks in, n. out with a sqwk, d. in. Loud taps - within nest? 7:38 - d>n to nest, sqwks, d. out, d>n feeds, in, cleans nest, then down to thicket. 7:44 d>n to nest, in, cleans nest, back, in. Now d. to nest, sqwks + looks in, to above nest, taps, to nest, in, out, back in. Tapping. Young quiet. The tapping in the nest continued until 8:03 P.M. I waited until 8:07 P.M., by which time it was too dark by the nest to see anything, and all the birds were silent except a few Robins up on the plateau where it was fairly light, and the Nighthawks. As far as I can tell, d>n and d. were both on the nest, which increases my suspicion that they are both ♀s. ^(later proved wrong) Probably the tapping, which I heard in the afternoon also but hesitated to record as coming from the nest, is serving to enlarge the cavity to fit the growing family. The oldest young in this nest are 11 days old.

June 20 3:47 A.M. at #7 - too dark to see nest, but no sound from it. 4:00 A.M. - skies lightening, but light clouds in the east. 4:12 - d>n to nest from small pines 15 yds away; looks in and gives (or elicits) long series of whining sqwks, finally goes in, 4:14. Sqwks continue until 4:18 - d>n looks out several times, back in. 4:19 - n. to branch by nest, sqwks, d>n out, then d. out; n. several looks in, goes in, out to pine 5 yds away, back to below nest to nest, in. clouds in East are orange now.

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June 20 (cont'd.) - N. had food with him; I could not tell about d>n, but I don't think so. 4:25 - d>n to nest from thicket, sqwks, n. out, d>n in. Young silent still. 4:29 - n. to nest, several looks in, silent, to below nest, sits. 4:30^{n.} all around nest and several looks in, screaming. 4:32 n. to nest, in, out 4:33, still with food, to asp 6ft off, back to nest, sqwks, in. 4:39 - d. to nest with much food, sqwks, n. out, d>n out, d. feeds twice, whets bill; young now audible; d. goes in. 4:44 - n. to nest, sqwks, d. out, n. feeds, away. Now d>n to nest, in. 4:46 - tattoo in distance, also screams. 4:49 - n. to nest, looks in, sqwks, d>n out, n. looks, feeds, in. 4:50^{sqwks} n. out; n. cleans nest, back in, cleans nest - both to alternate tree, back in. 4:53 - d>n to nest, sqwks, n. out, d>n in. 4:56 - d. to nest, sqwks, d>n out, d. in. 4:58 - n. to nest, sqwks, d. out, n. goes in on fourth "duck." 5:01 - d. to nest, sqwks, n. out, d. in. 5:03 - d>n to nest, sqwks, d. out, d>n in. D. screams from about 30 yds off. 5:08 - d. to nest, looks in, above, then below nest, back to it, in, out, still with food; this is repeated twice more, finally in again at 5:10. Sun now over plateau, in tree tops by nest. 5:14 d. out, taps 6ft away. Food gone. 5:15 - n. to nest, sqwks, d>n out, n. feeds, in. D. still taps, now down to thicket. 5:17^{A.M.} - I leave; feet + hands almost numb with chill.

This nest faces west on the west side of the meadow through which Willow Creek runs. At this point the creek runs from north to south, and on either side are

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June 20 (cont'd.) rocky plateaus with juniper, pine, and mountain mahogany trees and sage brush and a little manzanita. Along the creek are clumps of willows. The sapsuckers almost always fly off either to the east or south, taken broadly. I do not recall seeing one go off to the northwest, where there are many aspens but not other nests that I could find, but that is the only direction they do not seem to utilize.

At some time d>n must have come off the nest, probably last night unnoticed by me in the dusk. At any rate, d. seems to have spent the night in the nest. I did not hear sounds from the young until 4:39 A.M.; they were noisy at the next visit, then quieted down again.

8:25 A.M. - At #1 - I met n>d about 50 yds away picking insects out of a little pine on my way to the nest. 8:28 - d. to nest from W, in, out to E. 8:29 - n>d to nest, ^{from E.} in, out, off to W. 8:33 - n>d to nest from W, in out, off to W. 8:34 - d. to nest from W, in, cleans nest to asp 20 yds away - not usual. Now n>d to nest, in, out, to asp 10 yds off. D. flies past him to S. 8:38 d. to nest from W, in, cleans nest to same tree as just before; now n>d to nest from E, in, out, off to N. The young can be heard all the time, but are loudest when a parent enters or leaves. 8:42 - d. to nest, in, cleans nest to same tree, off to W. 8:45 - n>d, then d. to nest at same time from opp. directions; sqwks, n>d in, d. to another tree; n>d out, d. to nest in, cleans nest to a big pine 15 yds off.

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June 20 (cont'd.) 8:47 - bird to nest from W., in, out about 1 min. later, to N. I think it was d. 8:49 - nxd to nest, in, out, off to E. 8:50 - nxd to nest from E, in, out, off to E. 8:52 - same. 8:54 nxd to nest from E, looks in, in, out, off to W. 8:55 d. to nest from W., in, out about 30 sec. later with debris to same big pine 15 yds away. 9:01 - bird to nest from W., in, out, off to E. 9:03 - nxd to nest from W., in, out, off to E. 9:05 - bird to nest from E., in, out, off to NE. 9:07 - nxd to nest from W., in, out, off to NE. 9:08 - d. to nest from W., in, cleans nest to the asp 20 yds off. 9:09 - nxd to nest, in, out, off to W. Now d. to nest, in, cleans nest to usual tree, off to W. 9:12 - nxd to nest from W., in, out, to NE. D. to nest, in, cleans it to the big pine. 9:14 - nxd to nest from NE, in, out, off to NE. 9:16 - d. to nest from W., in; nxd to nest, in; d. out, then nxd out. No sqwks. 9:18 - d. to nest from W., in; nxd to nest, starts to go in, d. out, sqwks, nxd in, out, off to W. 9:24 - d. to nest from N., in, out, off to W. 9:25 - nxd to nest from W., in, out to N. 9:28 - d. to nest from W., in, out just as nxd comes from W.; they collide glancingly in mid-air, sqwk; n. to nest, in, out. 9:30 d. to nest from W., in, out, off to W., then nxd to nest from NE, in, out, off to NE. 9:32 - nxd to nest from W., in, out, off to NE. 9:34 - same. 9:39 - nxd to nest from N., in, out, off to W. 9:42 - d. 10 yds S. of nest, on ground getting food; nxd to nest from W., in, out, off to W.; d. to nest, in, cleans nest, back to ground, this time N. of nest. Now around nest, to small trees and ground. 9:48 - d. to nest, in, cleans it to asp 20 yds off. 9:49 - nxd to nest, in, out, off to NE.

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June 20 (cont'd.) - 9:50 - bird to nest, in, out, away. 9:51 nxd to nest, in, out, off to NE. 9:54 - nxd to nest from W, ^{looks in} in, out, off to NE. 9:56 nxd to nest from NE, looks in, in, out, off to NE. 9:58 - d. to nest from W, in, out, off to W - now nxd, same. 10:02 - d. to nest from W, in, about 30 sec., out, off to NE. 10:04 - nxd to nest from W, in, out, off to NE. 10:05 - same. 10:06 - ~~same~~ same, but d. 10:08 same, then same with nxd. one sqwk as d. left. 10:14 d. to nest from W, in, out, off to W. 10:15 - same, but nxd. 10:19 nxd to near nest from N. - d. to nest from W - sqwk - d. in, out; nxd to nest, in with dragon fly, out, off to NE. 10:21 - nxd to nest from W, in, d. to nest nxd out, off to W, d. in. 10:23 - d. out, off to W. 10:24 - nxd to nest from W, in, out, off to W. At this point I went up to the nest to look in at the young, which are about 17 days old. As far as I could tell with the mirror, they have full juvenal plumage - sooty on the head and breast, and mottled black and white remiges and rectrices. Their eyes are fully open. These should be ready to leave the nest before many more days. 11:30 - At last I found the nest of the sapsuckers that are so often by the ranger station. It is about 40-50 ft up in a half-dead yellow pine which has numerous other holes in it. The birds are both daggetti but show some signs of nuchalis head striping. The pine is right across the meadow from the ranger station. This nest is, then, #10; possibly the pair is the same that I saw originally as excavating nest #4. 1:30 - at #10 - 1:34 A. to nest, sqwks, in with food, out, away. 1:38 - B to left of nest, with food, picks at bark, to nest, goes in.

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Crowder Flat, 5200ft, 38mi. NNW of Alturas, Modoc Co, Calif.

June 20 (cont'd.) 1:39 - A to nest, squaks, B out, a looks in, in.
2:01 - B out, to big pine 5yds away, down towards meadow.
There may have been activity in between; this is a hard nest to watch, silhouetted against a white sky.
2:03 - tattoo from meadow. 2:07 - A to left of nest, to nest, in. 2:10 - B to nest from big pine, seems to have a lepidopteran; squaks; A out, B in. 2:13 - B out with debris to big pine 20 yds away. 2:17 - A to big pine 5yds away; 2:18 - A to nest, in. 2:23 - B to nest by same route, squaks, aside as A out, A looks in, in. 2:29 - screams from m. mahogany thicket below nest on edge of meadow. 2:37 I leave - the sun is right behind the nest from the only good view of it.

As in the case of nest #3, I am using A and B to refer to what may be alternate birds or the same one coming back and leaving several times in succession.
7:05 P.M. - sky mostly clear, at nest #3. 7:06 - A to nest u.r., screaming. Several looks in, feeds, away to this side. 7:08 - B to asp 6ft off, screams, to nest direct, looks in, feeds, to this side. Young are cheeping loudly. 7:12 - Same - then to asp 6ft off, has dragon fly; to nest u.r., looks in + feeds or tries to; to branch by nest, back to nest, feeds, away to this side. 7:13 - B to nest direct, in, out, away to this side. 7:15 - A to nest direct from this side, B to asp 6ft off, from this side. A in; B to nest, squaks, A out, B in, out to branch, away to this side also. 7:19 - A to asp, to nest, feeds twice, off to this side, from where it came. 7:21 - B direct to nest from this side, almost all in, out off.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas, Modoc Co., Calif.

June 20 (cont'd.) 7:25 - A direct to nest from this side, feeds several times, in, out with a sqwk, screams on branch by nest, away to this side. The daylight is beginning to fade noticeably. 7:27 B direct to nest, in; loud crier from young, as in previous case; 7:31 - B out, cleans nest to s.d.a., off to this side. Now A to nest, in, out to branch by nest, off to this side. 7:36 - B to nest direct from this side, almost all in, out to branch, off to this side. 7:37 - A to nest u.r., in, out, to asp 10 yds away, taps. 7:43 - B to nest direct, feeds, up to branch above nest, flycatches, off to this side. Colors of clouds in west fading, area of nest still fairly light. 7:45 - A to nest direct from this side, looks in, in, cleans nest to s.d.a. 7:46 - A or B back to nest, in, cleans to s.d.a., ~~out~~ away to this side. 7:57 - A to nest u.r., in. Dusk. Nighthawks start calling. 7:58.5 - A out, to 15 yds off, screams several times. Now to asp 6 ft off, to nest u.r., in. Young crying, tapping within nest. 8:05 tapping stops. 8:12 - cries of young stop. - too dark to see nest clearly, I leave, at 8:15 P.M.

June ~~20~~ 21 - 3:47 A.M. - at #3 - still too dark to see nest clearly. Sky is lightening, but overcast. 4:10 - B from base of nest tree up to asp 6 ft away, with a cry. A out of nest, off to this side. B to nest u.r., lots of screams, with food. Looks in nest, aside to branch, back to nest, still screaming, almost all the way in, out to branch, to asp 6 ft off, off to this side 4:13. It is now about as light as at 7:30 P.M. No sound from young. 4:16 - A to asp, to nest direct with a scream. Head in, feeds half in, out to branch, away. Now B to nest direct, all in, then out, away. Tattoo from direction that B went. When A entered at

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Crowder Flat, 5200ft, 38 mi. NNW of Alturas, Modoc Co., Calif.

June 21 (cont'd.) 4:16, there were faint cries from the young which are still barely audible. 4:20 A.M. - A to nest v.r., feeds, all in, out to branch, away, screams once. 4:24 - B to nest v.r., feeds, off across meadow, screams. Now A to nest, most in, all in, out, off to this side. Tattoos from across meadow. 4:27 - A (I guess) to nest from this side, direct, feeds twice, away to this side. Young silent. 4:29 - same, but feeds once. More tattoos across meadow, screams. 4:32 - "A" (?) to nest direct from this side, in, out to asp 6ft off (just "asp" from now on), away. 4:34 - A? to nest direct, in, out, off to this side. 4:35 - same. 4:38 - B? to nest direct from this side, 2 looks, in, out to branch, off across meadow. Now A direct to nest from this side, in, out, back to this side. 4:41 - B to nest from across meadow, v.r., in, out to branch, pause, off to this side. 4:42 - A to nest v.r., in, out, off across meadow. First faint sun in tree tops. 4:44 - B to nest, in, out, off to this side, back to nest direct, in, out to branch, off to SE. 4:48 - A to nest direct from this side, in, out just as B comes up, same route; faint squaks, A off, B in, out to branch, also off to this side. Young audible but faint. 4:51 - A to nest direct, in, out, all from to this side. 4:52 - B to nest same route, half in, in, out, ^{to branch,} away to SE. Young louder. Sun well up, sky daytime blue. 4:55 - A to nest direct, in, out to asp, off, all this side. 4:56 - B to nest v.r., in, out to branch, to asps 15 yds away, taps. Tattoo from near nest #6, B away. 5:00 A.M. - A to nest direct from this side, in, out, across meadow. 5:04 - B to nest from across meadow, v.r., in, out to this side. 5:07 - A to nest direct, in, out, all to this side. 5:10 - same. 5:12 - Tattoos across meadow. 5:13 same as 5:10, but not quite all in. Young more audible.

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June 21 (cont'd.) - 5:15 - B to nest dir. in, out to branch, 5:16 - A comes up, alights opposite B. Loud sqwks. B to asp, A to nest, in, out, to asp, sqwks, B leaves, A to this side, tattoos loudly once. 5:21 - A to nest direct, in, out to asp, off, all to this side. It is full daylight, and the sun is shining in the meadow when not obscured by a cloud. I leave. The young in this nest #3 are 18 days old today, but apparently one parent still roosts in the nest. It seems that feeding commences at the usual rate as soon as the birds come off the roost. Noise does not show any effect of activating them, as a House Wren was singing loud and long right outside the nest from at least 3:47 A.M. on.

7:55 - at #10 - 7:56 - A out, cleans nest to same big pine 20 yds off as yesterday. 8:02 - B to nest from adjacent pine 5 yds away, in. (that pine will be capitalized hereafter). 8:09 - A to nest direct, sqwks, B out, A in. The birds seem to arrive and leave to the N., towards the meadow; the nest faces NE. 8:20 - B. to nest from S., surprising me; sqwks, to right of nest as A out to N, B in. 8:25 - A to nest from meadow, sqwks, to left as B out to meadow side, A in. 8:27 - tapping within nest. 8:31 - B to Pine, to nest; sqwks; to right as A out to N, B in. 8:35 - tattoos from meadow - possibly on fence posts. 8:42 - A to nest from N, sqwks, to right as B out, A flies out after B short way, back to nest, looks in, in. As with the other nests, there are flies around this one, and the parents bring food each time. 8:48 - White-breasted Nuthatch scrambles by about 18 in. from nest, calling. B looks out, back in. 8:53 - 5 yelps, then tattoo from meadow. 8:54 - A to Pine, faint sqwk, to nest, sqwks,

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June 21 (cont'd.), to right as B out to N, A in. The sun during this observation is shining on the birds' left side as they face the nest; the nest itself is in sun. 9:01- A d. appears from S. to dead top of nest pine, taps. I hear a sqwk, see A leave nest to "disposal" tree. A third bird appears below the tapper - which is B I can't say. They hitch around, and one chases the other to the pine, then to disposal tree. 3 birds are in the tree, there is much loud sqwking and chasing that I cannot follow. One bird leaves to the N. 9:04- A (let us say) to Pine, to nest, in; has winged insect, probably a dragon fly. 9:05- B to nest, sqwks, to right, to left as A out, B in. 9:15- A to nest, sqwks, to left as B out, A in. 9:18- A glances out as 2 chickadees work by. I can see A's head working busily just inside the hole - possibly trying to catch flies, or whetting bill, or cleaning entrance. 9:25- B to Pine, usual frequent x-wise perching, to right of nest, to nest, sqwks, just ducks as A out, B in. Now B out to Pine, away. Tattoo from meadow. 9:30- A to nest, faint sqwk, in; 9:31- A out to disposal tree, back to nest from left side, in. 9:36- B from N. as though to alight in Pine, the fly catches, direct to left of nest, sqwks, A out, B in. 9:39- tapping in nest. 9:50- A to Pine, x-wise, to nest, sqwks, to right, B out, A in. 9:51- A out, I think to disposal tree; back to right of nest, picks around nest at what I guess are flies; 9:52- A back in. 9:56- B to Pine, x-wise, up to left of nest, sqwks, A out, B in. 10:23- at #1; 10:24- ~~d~~ nrd to nest, feeds, off to W. 10:27- bird to nest from W, feeds twice, off to E, now across to W. The cries of the young are louder than ever. 10:28- same.

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June 21 (cont'd.) - 10:29 - bird to nest from E., feeds, off to W.
10:30 - n>d to nest, 10 ducks in, away. 10:31 - n>d to nest
feeds once, off. 10:36 - bird to nest, feeds, off. 10:37 - same.
10:38 - same - I think this is d. 10:38.5 - same, 10:39 - same.
10:40.5 - same - d. for sure? At this point I ran out of ink
and returned for some; I will go back to the nest in a
few minutes. The activity is so fast I will have to omit
the parts about which direction the birds come and go
to (+ from). I will just try to identify the parent, which
is difficult as they get their heads in the nest so rapidly.
11:23 - back at #1. - 11:25 - n>d feeds twice - to W. 11:28 n>d.
again feeds, off to N. 11:29 - d. feeds once 11:31 - n>d feeds once.
11:34 - n>d feeds once. 11:35 - ? feeds once. 11:37 - same. 11:39 n>d
feeds thrice. 11:41 - n>d feeds once. 11:43 - ? to nest, feeds thrice.
11:47 - n>d feeds once. D. nearby, within 10 yds, picking around
+ flycatching, now off to W. 11:49 - ? feeds twice. Jay nearby,
noisy; 11:54 - n>d feeds twice 11:55 - n>d feeds thrice 11:57 - n>d
feeds once. 11:58 - same. 12:00 - same. 12:03 - n>d feeds twice. 12:05 same.
12:07 - same. 12:09 - same. 12:10 - n>d feeds 4 times. 12:13 - n>d, 3 times.
12:15 - n>d, twice. 12:17, same. Young almost silent. 12:19 - n>d, 4 times.
12:23 - n>d to nest, bobs in 5 times, away with some food left.
12:24 n>d, twice, off over 100 yds to N. 12:26 - same. I leave.

Most of the time n>d came from the W. and left to the N;
it might circle to the W. or fly that way a minute later.
I question any identification of d. at the nest. At 11:47
I saw both at once; d. was around but not feeding the
young. N>d was working a furious pace. At no time did
an adult go in the nest. These young are about 18 days old.

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Crowder Flat, 5200ft., 38 mi NNW of Alturas, Modoc Co., Calif.

June 21 (cont'd.) - 2:25 PM. - at #7 - young noisy. 2:26 - d'n to nest, feeds, away. 2:27 - n. to nest, sqwk, feeds almost all in, backs out, away, to NE; from S. 2:31 - d'n from S., in very slowly, out to below nest, whets beak; now d. up to nest with sqwk, in slowly; d'n away. D. must have left, for at 2:40 d. returns to nest from S., out to catch flying insect, to nest, in slowly. 2:41 d'n to nest from NE, looks in, d. out, d'n in slowly, out, off to NE. 2:45 - n. to nest, looks in, then feeds half in, out, to thicket - I could see part of an insect near the base of his beak. 2:51 - d. to nest from SW - in; 2:53 - cleans nest, away to S. 2:55 - n. to nest from NE, looks in, in slowly, out, off to S. 2:57 - d. to nest from S., in; 2:58 - cleans nest to other tree; down to thicket. 2:59 - d'n to nest from thicket, feeds, off to S. 3:01 d'n from S., in, out to below nest, picks around. 3:03 - n. to nest, sqwks, 2 looks in, in, out, off to N. D'n doesn't move; 3:04 d'n flies off to N. 3:06 - d'n back to nest, in; out, to below nest, picks around holes there. 3:08 - to small pine 25 yds S.; back to nest, in, out to below nest, picks; 3:11 - across meadow. 3:14 - d. from thicket, in, then out across meadow, to NE, 3:15 - n. to nest, 2 looks, in, out, off to NE, like others. 3:25 - n. to nest from S., 3 looks, all in, out, to thicket. 3:26 d'n to nest from S., in, out, to below nest, away. 3:28 d'n to nest from NE, feeds, away across meadow. 3:30 - d. from thicket, looks in, in. 3:31 - n. from S., looks in, sqwks, d. out, n. looks in, in. Now d'n to nest, 5 looks in, n. out with a sqwk, d'n in, out to below nest. 3:34 d. from S, in. 3:36 - d. out, to pine close by, scratches, whets bill, to nest tree, taps; 3:37 - n. to nest, sqwks, feeds twice, off to the S.

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Crowder Flat, 5200 ft, 38 mi. NNW of Alturas, Modoc Co., Calif.

June ~~21~~ 21 (cont'd.) 3:40 - d. up from meadow, in, out, off to NE.
3:42 - n. to nest from S, looks in, in, out, off to S. 3:45 - d. to nest,
from E, in. 3:46 - brief tapping, d. out, away to S. 3:47 - d>n from
S, goes half in, backs out, off to NE. 3:48 d. from S, looks in,
in, out, off to S. 3:51 d>n from E, in; 3:52 n. from S with
a sqwk, 2 looks in, in. I did not see d>n leave. N. right
out, off to NE. 3:55 - d>n must have left. D. to nest from S,
in, cleans nest. 3:57 - d. to nest from N, in; cleans nest. 3:58
d>n to nest, in, out, looking from side to side first, as it has
done several times this afternoon. D>n out to asp 6 ft away
n. to nest with sqwk, feeds, off to S. D>n flycatches, around
base of nest tree, leaves. 4:00 P.M. So do I.

6:53 P.M. at #1. Young audible, not particularly loud. 6:55 n>d
to nest, feeds thrice. 6:56 - same. 6:59 n>d feeds twice. 7:02 -
n>d feeds thrice. 7:04 - n>d feeds twice. 7:07 - same. 7:10 - n>d feeds once.
7:12 - same. 7:13 - same. 7:17 - n>d feeds twice. 7:19 - same. Young noisier.
7:21 n>d feeds 4 times; big chickaree on same tree ignored.
7:22 n>d feeds thrice. 7:24 - n>d feeds twice. 7:26 n>d feed 4 times,
then to pine 10 yds away, gets more insects, back to nest, feeds
twice; seems to notice squirrels, which are quite noisy now.
7:30 - n>d to nest, feeds once. Light just beginning to fade. 7:31 - same.
7:32 - n>d to nest, does not feed, to asp 5 yds off, back, feeds
twice. 7:37 - n>d feeds 4 times. 7:41 n>d feeds once. All birds
quiet except the young saps. 7:44 - n>d in asp 10 yds off, screams.
7:45 - n>d feeds 11 times, goes in on 12th, out right away,
screams + taps from 25 yds to W. 7:49 - young silent. Still
fairly light. Pewees, Olive-sideds, Robins, Nighthawks call.
8:10 - All birds silent. Rather dark by nest, but light

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June 21 (cont'd.) out in open meadows. No stars visible. I leave, 8:10. I am almost certain that only n>d visited the nest, and I am positive it did at least half the time. Could d, not too "pure" a d., have become worn to resemble n>d more closely? I think not. If both had been feeding; I probably would have seen both at once as always before. The young in #1 are about 18 days old; it seems that a parent does not roost on the nest at this stage. N>d went in, then came out, and d. was not seen in the evening.

Noteworthy at #7 was the fact that there was little remaining in the nest by any of the parents; it was mostly feed and leave, or go in, then come right out. When I write "feed," by the way, I mean the bird gets his head in the nest—it may be looking or pushing young aside, but I can't write down all the probabilities on the spot. When I say "look," that means the head is ducked or bobbed in and out at a rate that seems too fast for feeding.

June 22 - 3:50^{AM} - at #1 - much too dark by nest to see. Moon still bright. 4:11 - 4 harsh screams from saps, 5 yds to E of nest; bird then to nest, several looks or feeds, in, looks out, back in, then out to asp 5 yds off. More screams. I thought I heard the young, and if so they are silent again. It is about as light as at 8:05 last night - too dark to tell which parent it was. 4:18 - n>d 2 looks in, back to 5 yds off. Screams. A bird comes from near nest tree, off to W. 4:21. Tattoos from W, about 30-40 yds away. Sun not yet up.

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Crowder Flat, 5200ft, 38 mi. NNW of Alturas, Modoc Co., Calif.

June 22 (cont'd.) 4:24 A.M. - bird to nest from asps 5yds off, in, out, screams, off to W. Faint cries of young as bird went in. 4:27 - nxd 5yds from nest, screams, to nest, looks in, in, fairly loud cries from young, nxd out, off to N. Cries cease. 4:29 - bird to nest, screams, in, cries from young, bird out, off to N. Cries soft, continue. 4:31 - bird to nest, looks in, in, out, off to W. 4:33 - same. 4:36 - nxd to nest, 4 screams, ^{looks in,} in, out to asp 5yds off, harsh screams, off to SW. 4:39 - nxd to nest, ~~in~~, looks in, in, out, off to W. 4:43 - bird to nest, in, out, off to N from whence it came. 4:48 - nxd to nest, screams, looks in, in, out to asp 5yds off, taps, off to N. 4:51 - same, but 3 looks. 4:55 - bird to nest, looks in, in, out to asp 5yds off, off to W. 4:59 - nxd to nest, screams, in, out, off to W. 5:01 - nxd to asp 5yds off, from W., to nest, in, out, back to asp, ~~off~~ taps, off to E. I leave. 6:50 - Back at #1. 6:51 - nxd from W., feeds once, off to E. Does not go in. 6:52 - nxd from E, feeds once, off to W. 6:54 - nxd from W, 2 feeds, off to W. 6:57 - nxd from W, feeds once, to N. 6:58 - same, but to W. 7:00 A.M. - same. 7:01 - same. 7:05 - same. 7:07, same, but 2 feeds. 7:09 - same, but one feed. 7:11 - same, but 2 feeds. 7:13 - same, feeds once. 7:15 - same, 2 feeds. 7:18 - same. 7:20 - same, 3 feeds. 7:23 - same, 2 feeds. 7:25 - same, feeds once. 7:27 - same, 2 feeds. Immature white-breasted Nuthatch near nest hole is ignored. 7:28 - nxd from W., feeds once, off to E. 7:29 - nxd from E., one feed, off to E. 7:30 - nxd from E, 3 feeds, off to W. 7:38 - nxd from W, 2 feeds, to asp 5yds off; chickadees numerous, all chattering. Nxd screams several times, to nest, then off to W, 7:40. 7:42 - nxd from W., 3 feeds, off to E. 7:44 - d'n from W, one feed, to E. 7:45 - nxd from E, one feed, to W. 7:47 - nxd from W, one feed, off to E. 7:48 - across meadow over to W.

sp. He d.

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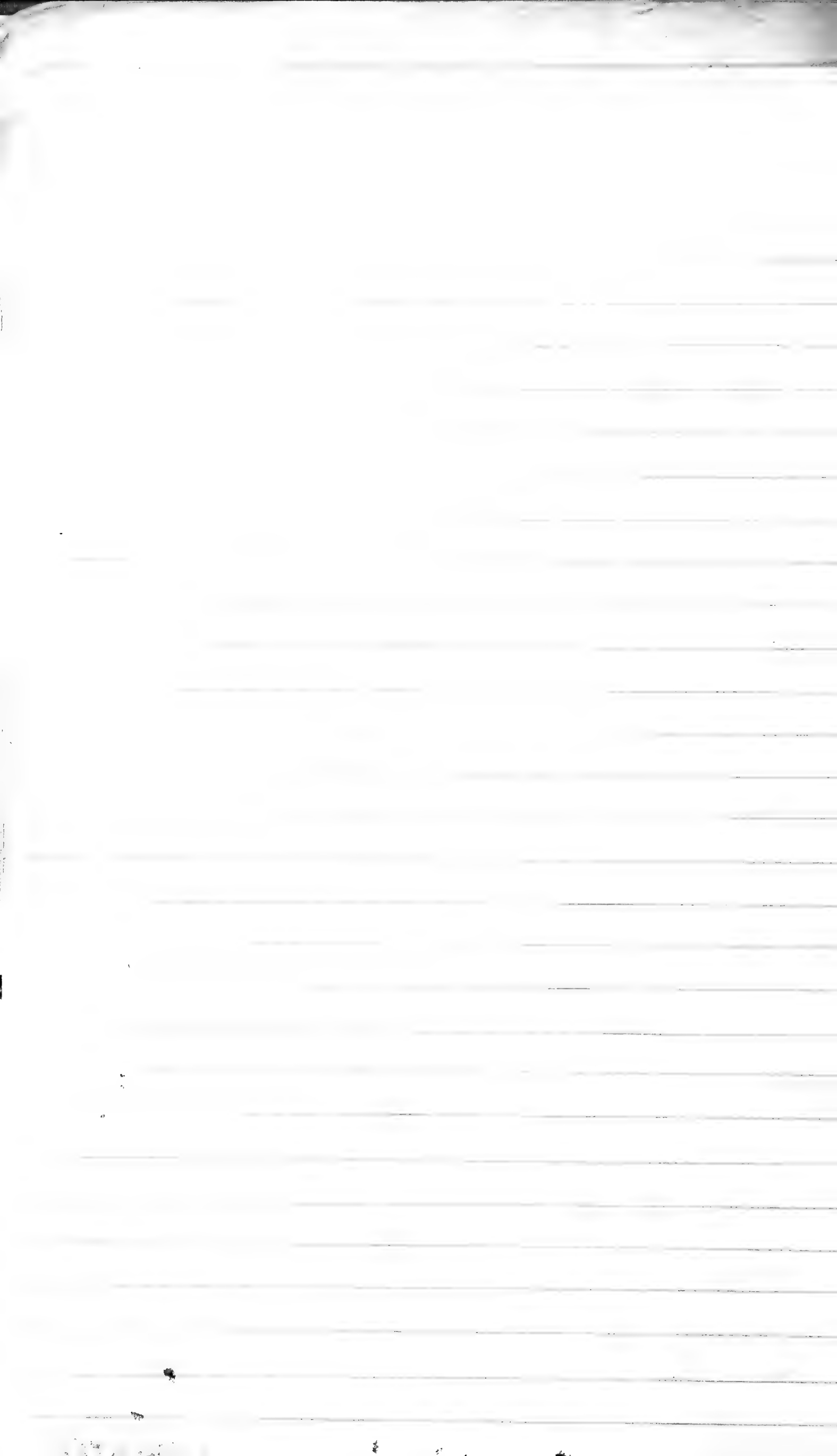
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Crowder Flat, 5200ft., 38mi. NNW of Alturas, Modoc Co., Calif.

June 22 (cont'd.) 7:49-n>d from W., one feed, off to W. 7:51, same, but 2 feeds. 7:53-same, one feed. 7:56-same, 3 feeds. 7:58-same, 1 feed. 7:59-same, 2 feeds. 8:05-same, 3 feeds. 8:07-same, one feed. 8:10-same, 8:11-same, 3 feeds. 8:14-same, one feed. 8:16-same, 2 feeds. 8:19-same; n>d flycatches, stops at small asp 5yds to W., the farther to W. 8:20-n>d from W., 3 feeds, off to W. 8:23, same, 1 feed. 8:26-same, 2 feeds. 8:29-same. 8:33-same, one feed. 8:35-same. 8:36-same, 2 feeds. 8:38-same, one feed. 8:42-same. 8:43-same, 6 feeds. 8:45-tattoo from 40yds off, again. Screams. 8:46-a typical nuchalis alights in tree, above nest, screams, off to S., screams again, distant. 8:47-n>d to nest from W, 1 feed, off to W. 8:50-same, 2 feeds. I leave.

N>d is still very busy, but does not go in the nest as it did in the dawn hours. The nest must be getting pretty dirty as I have not seen n>d clean it, and d. has not been to it. The visit from a typical nuchalis, a ♂, I think, was unusual. This nest, #1, is quite a long way from #7—at least $\frac{1}{2}$ mi. Perhaps #7's n. goes this far afield, but I doubt it. The young cried constantly.

10:39-at #7- n. feeds 5 times, off to NE. 10:45-n. from W, several looks + feeds, about 5 short screams, in, out, to E. 10:48-d>n from S, looks in, in; 10:49-d>n cleans nest; n. to nest, feeds, d. up from S., n. leaves with sqwks, d. in. 10:51-n. from thicket to branch by nest, sqwks, d. out, n. to nest, 2 looks, in. 10:57-d>n from SW; sqwks, n. out, d>n in; then out, to NW (first time). 11:03-d>n from NE, looks in, in, head out, looks around; n. from NE to branch, sqwks, d>n out, n. several looks in, in, out. 11:08-d>n from S., looks in, in, n. up to ^{branch by} nest sqwks, d>n out, n. in, out to SW. 11:09-d. to nest, in, cleans nest, back in. 11:13-d. cleans nest. 11:16-d>n to nest, in, cleans nest



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June 22 (cont'd.) just as d. to nest; d. in, then cleans nest, back in. 11:17 - n. from thicket, sqwks, d. out, n. in, out to NE. 11:20 - d. to nest from W., in. 11:22 - d>n from NE, looks in, sqwks, d. out, d>n in. 11:24 - n. from NE, sqwks, d. out, n. in, out, to thicket. 11:25 - n. from S., feeds twice, off to W. 11:29 - n. from W., 3 feeds, off to S. 11:32 - d. from S., looks in, in; out, to thicket. Screams. 11:34 - bird to nest, feeds, off to NE. 11:35 - d. to nest from S., in, out, to NE. 11:41 - n. to nest, feeds once, off to S. 11:43 - d. from thicket, in, cleans nest just as n. comes, sqwks, n. 3 feeds, in, out, to NE. Now d>n to nest, feeds twice, then to various trees within a few yds. of nest, to S. 11:45 d>n back, in slowly, head out, looks around, out to thicket. 11:48 - d. from S., in, cleans nest, off to S. 11:50 - n. from W., screams twice, d>n to below n, sqwks, n. feeds 3-4 times, in, out; d>n from branch to nest, in, cleans nest. 11:52 d>n from S., in; cleans nest to pine beyond, to NW. 11:53 - n. from S., 4 feeds, in, head out, looks around, out, to SW. 11:54 d>n in, looks around, out, to below nest. 11:55 - same; 11:56 - d>n across meadow, as d. to nest, sqwk, in; now n. to nest, sqwks, d. cleans nest, n. feeds, in. 12:00 - d>n from NE, sqwks, n. out, d>n in, looks out & around, out to SW. I leave.

All birds still feeding actively; d. has not been seen feeding without going all the way in the nest. N. seems to go in only so he can reach a young bird, for he comes out immediately. D>n has a habit of putting out its head and carefully looking in all directions before leaving. N. does this to a much lesser extent. #7 is very uncomfortable to watch - hard ground, crawling with red ants and ticks.

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Crowder Flat, 5200 ft., 38 mi NNW of Alturas, Modoc Co., Calif.

June 22 (cont'd.) 1:58 - at #3; 2:01 - A to nest, u.r., screams;
followed by B to asp; A feeds twice, B to nest u.r., screaming
+ feeding about 8 times, off. Come + go to E. (= "this side")
Young crying constantly, but not loudly. 2:05 - A to nest direct from
E., 2 feeds, to asps 15 yds N. (N. asps from now on). 2:09
B to nest direct from E., 2 feeds, to branch by nest, off to NW.
A follows identically, but back to E. 2:15 - same, with a scream
given on the wing on leaving. 2:17 - A to nest u.r., 2 feeds, to
branch, across meadow to W. Cries of young loud at feeding.
2:21 - B to nest direct from E., 2 feeds, to asp, back to E, with
screams. 2:22 - A from E direct, 4 feeds, back to E. 2:27 - B from
E direct, 2 feeds, back to E. 2:31 - A direct from SE, 2 feeds,
off to SE. 2:33 - B from E direct, off to E without feeding. 2:35
same, but feeds once. 2:37 - A direct, from SE, feeds once, to
branch by nest; B direct from E, feeds once, over to branch
by A; A off to E; B. follows a few seconds later. No squaks.
2:41 - A direct from E, 2 feeds, off to E. 2:42 - same, but 1 feed.
Now loud cries from young; scream from nearby parent. 2:45 -
A direct from E, 2 feeds, to branch, to N. asps. 2:46 - B direct,
2 feeds, to branch, off to E. 2:49 - A from E direct, 4 feeds, loud
cries from young, off to E. 2:51 - B from E direct, 1 feed, off to W.
2:53 - A from E direct, one feed, to branch, off to E. 2:54 - same,
but not to branch. Loud cries from young at these feedings.
2:57 - same as 2:54. 2:58 - same, but off to SE. It is very windy.
3:02 - same, but off to E. 3:06 - "B" direct from E., 2 feeds, off to N.
3:07 - A direct from E., 1 feed, to branch, off to E. 3:12 - B from E direct,
2 feeds, then A from E direct to rt. side of nest during 2nd feed.
B to branch with squaks, A to nest, B off to W, A 3 feeds, to E.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas, Modoc Co., Calif.

June 22 (cont'd.) - 3:14 - B to nest, feeds, off to E. 3:16 - A from E direct, 2 feeds, off to E. 3:20 ^B same, but 4 feeds, then in. Now A direct from E, seems to feed, to branch, then off to SE, B out, off to E. No squaks. 3:25 - A from E direct, 1 feed, to branch, whets bill, off to E. 3:26 - B, same, but leaves directly. [Unless I put u.r. for what was the usual route, assume bird goes directly to nest]. 3:30 - A from E, 2 feeds, off to E. 3:33 - B, same, but to N. asps, then off to N. 3:37 - A from E, 2 feeds, to branch, off to E. 3:38 - B from E, 1 feed, to branch, to asp, off to W. 3:39 - A from E, 2 feeds, in; out, off to E. No cleaning of nest. 3:41 - B from E, 2 feeds, off to E. 3:44 - A from E, feeds, to right of nest then in. 3:46 - out, off to E. 3:47 - B from E, 2 feeds, off to NW. 3:48 - A from E, 1 feed, off to E. 3:51 - B from W, u.r., 1 feed, off to E. 3:52 - A from E, 1 feed, off to E. 3:56 - A, B from E in succession. A at branch, B feeds 3 times, to E; A 1 feed, to E. 3:57 - B from E, 2 feeds, in. 4:01 - A from E, B out to E, A away to E. without feeding. I leave. During the warm parts of the day, at least, the parents show little tendency to go in the nest at this stage - 19 day-old young. Although A and B are, of course, terms of convenience and may not mean different birds each time, it is clear from the number of times both were seen together that both birds are participating in the feeding. At no time in this 2 hr. watch was the nest cleaned, which surprised me.

I now set out to pace off the distances between the nests on this stretch of meadow. #6 is almost exactly 100 yds N. of #3. Then 100 yds N. of #6, I found another nest, about 7 ft up in the usual type of asp - about

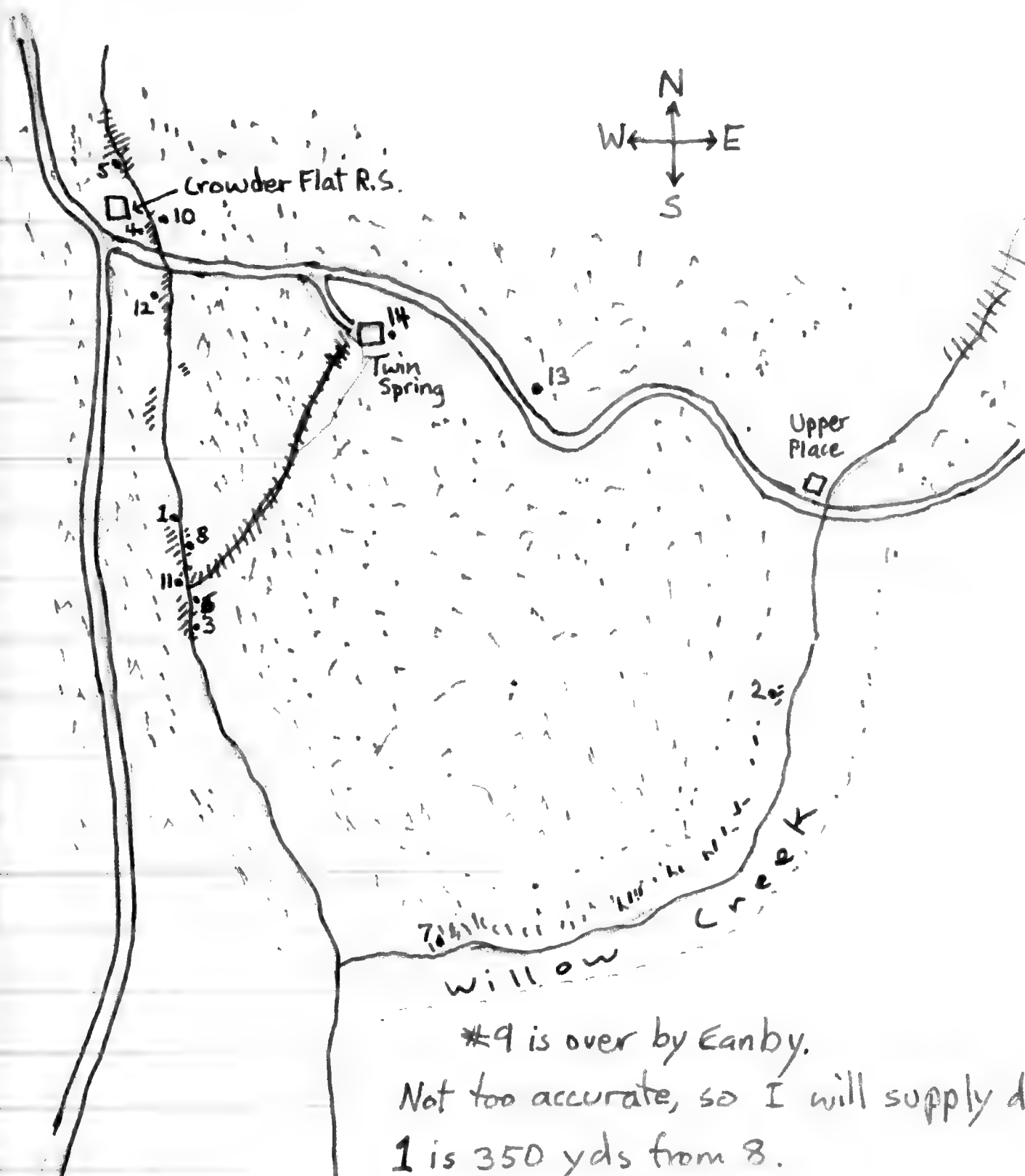
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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas, Modoc Co., Calif.

June 22 (cont'd.) 10 in in diameter, living, with several other holes in it. I was attracted to it by the now-familiar cries of sapsucker young of over 10 days old. A bird came up and screamed at me — it was a d. with food. I went on so as not to disturb them unduly or attract predators. This is nest #11; how I missed it until now I don't know. I remember tapping on that tree and getting no response about 2 wks ago, when the eggs were unhatched, I guess. I continued to pace off toward #8. This nest, by the way, is too difficult to watch for any length of time as the only place it can be clearly seen is so close that the parent birds are obviously distressed. #8 is about 400 yds N. of the new #11; possibly there are one or two nests between, as there are some suitable asps, but I heard no more young on this rapid jaunt. The meadow clears of trees a bit, and it is about 350 yds to #1. As I passed I heard the young and saw a parent feed them in the nest. I went on and came out to the asps on the SW. edge of the meadow about 100 yds SW of the ranger station. Here I heard young again, and located a nest, #12, in a big dead pine a few yards west of the aspens. A typical daggetti fed, then went in. This tree is about 45 ft. high, broken off sharply at the top, and dead. Like #10, however, the bark is still on it. A couple of feet down from the top is the nest; there are several other holes around it. The nest faces N. The nests are easy to find now that the young are so noisy. I can now draw a fair map of the nests in the area.



|||| = aspens

••• pine + juniper,
mostly pine, on
rocky flats

#9 is over by Eanby.

Not too accurate, so I will supply distances:

1 is 350 yds from 8.

8 is 400 yds from 11

11 is 100 yds from 6

6 is 100 yds from 3

5 is (was) 400 yds from the R.S.

4 is (was) at the R.S.

10 is 75 yds from the R.S.

12 is 100 yds from the R.S.

7 is about $\frac{1}{2}$ mile from 3

2 is (was) about $\frac{1}{3}$ mile from 7

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas, Modoc Co., Calif.

June 23 - At #1, 8:30 A.M. - ⁴ visits + feeds from between 8:30 and 8:34, while I am getting settled. Cries of young loud, audible at least 40 yds away. 8:36 n>d from W, feeds, off to W. 8:37 - n>d from E, 1 feed, off to E. 8:39 - bird from W, feeds, off. 8:39.5 - same - n>d. 8:40 - same. 8:41, same, 2 feeds. 8:43 - ^{1 feed} same. 8:44 - same. 8:47 - same. 8:49 - same. 8:50 - same. 8:50.5 same. 8:51 same. 8:51.5 same. 8:52 - same. 8:55 - same. 8:57.5 - same, but 2 feeds. 9:01 - same. 9:02 - same but 1 feed. 9:04 - same, 2 feeds. 9:07 same, 1 feed. 9:09 - same. 9:12 - same, 3 feeds. 9:16 - same, 1 feed. 9:18 - same, 2 feeds. 9:19 - ^{same,} 1 feed. 9:22 - same. 9:24 - same. 9:26.5 - same. 9:29 - same, 2 feeds. 9:30 - same, 1 feed. 9:31 same. 9:35, same, 2 feeds. 9:37 - same, 1 feed. 9:39 - same, 2 feeds. 9:41.5 - same. 9:43 - same. 9:45 - same 3 feeds. 9:48, same, 1 feed. 9:52 - same. 9:53 - same, 2 feeds. 9:55 - same. 9:57 - same. 9:58 - same. 10:06.5 - same, 4 feeds.

Between 10:08 and 10:15 I went to the area where n>d goes usually on leaving the nest. About 75 yds W. of the nest I saw n>d come and go 3 times from a group of small pines and mt. mahogany. N>d seems to be carrying on alone still, and most of the food-gathering is from the west side.

11:15 - at #11; between 11:15 and 11:25 there were 3 feedings, and the parent(s) did not go in. At 11:25, 28, 29, 31, and 11:33 a parent visited; different ones alternated. Both are typical d., or almost so. One has a small white post-ocular stripe that makes it easy to tell them apart. Yesterday I made some underestimates - the tree is about 12 in. thick, and the nest about 11 ft up, or about the same height as #7. Judging by the calls of the young, the rapidity of the feeding and the fact that the parents are not going in the nest, I would say that the young are about 20 days old.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas, Modoc Co., Calif.

June 23 (cont'd.) - 11:47 at #8 - d. near nest, in same tree, leaves at my approach. 11:50 - d>n to nest, feeds, off. 11:54 - d. to nest, 2 feeds, to small asp 10 yds away, sits, off to S. 12:00 d. to nest again, 2 feeds, to big pine near me, 20 yds away, looks at me curiously. 12:02 d>n to nest, 2 feeds, to another pine above me. Now d. to nest again, feeds, d>n screams several times, d. away from nest, over towards d>n. I leave. I am afraid this bold nest defense will attract predators. The young in #8 are about 18 days old, typically noisy.

12:13 - at #6 - d. to nest, in, wren hits at disappearing tail; d. out with debris, to usual pine, then to asp, by it, feeds on sap; 12:14 - d>n to nest, 2 feeds, away. Young noisy. 12:16 d from E, 2 feeds, to same asp, seems to eat sap, picks at holes in bark. 12:19 - d>n from E, 1 feed, off to E. Now d>n to "feeding asp" for a moment, eats sap, or seems to, then off to W. 12:24 - d>n at feeding asp, has insects in beak, may be getting more; then to E. 12:25 d>n from E, 1 feed, off to E. 12:28 - d. from E, flies by with squaks to feeding asp; d>n up right behind d. D. picks a moment, then to nest, in slowly - wren hits at tail - out, off to E. 12:30 d. from E, 1 feed, in, cleans nest, then to feeding asp, picks at holes, off to W, back to asp, to E; squaks; 12:33 d>n to right opposite nest, 2 screams, around to nest, scream, looks or feeds several times, in, out, to E. D. from E, in, cleans nest. 12:35 - d. from E, in, cleans nest again. I now go up and look in - the young fit the description of those in #1 on the 20th. They look well-fledged, eyes wide open, pale around the gape of the bill. These are 18 days old. It seems

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June 23 (cont'd.) that at all the nests checked today, except #1, feeding is being carried on at a rapid rate by both parents.

1:55 P.M. - I have found another nest, #13, about 40-50 ft up in a big dead pine with the bark still on. The nest faces east. It is by the road, about half way between the Twin Spring road and Upper Place. The young were calling loudly and must be well advanced as I could see their bills protrude from the nest opening. One parent is a d>n; I will find the other later this afternoon.

2:27- At #7. 2:29-d>n from S, in slowly, looks out, out, to NE
2:30-d. to nest, in, out, to NW (again) 2:33 n. from W, 3 feeds, last almost all in, backs out, off to NE. 2:34 n from NE, 2 feeds in, out with debris to small pine 5 yds off (not usual); d. to nest, sqwks, in. 2:35 d>n from NE, sqwks, d. out, d>n in, out, away.
2:39-n. from S., 2 looks, in, out to NE. 2:40 d>n in, looks out, out to NE. 2:43-d from S., 1 look, in, cleans nest to alternate tree, off to S. 2:46 d from S., in 2:47-d. out to asp 6 ft off, d>n to branch by nest, sqwks, to nest, in, looks out, out to same asp as d., sits, picks. 2:50-from tree to tree, flycatches; off to S.
2:52-n. from 150 yds to NE direct to nest, 2 looks, in, out as d. from S.; d. in. 2:55-d out, to pine 6 ft away. 2:57 d>n from S., in slowly, out, to NE. 2:58-n. from S, 3 feeds, off to N. 3:01.d>n from NE, in, 3 looks out, out. 3:02 n. from NE, 3 feeds, in, then cleans nest to alternate tree (same as d. at 2:43). 3:06-n from S, 3 feeds, in, again cleans nest to alternate tree. 3:07 d>n to nest, in, looks out, out, to asp 6 ft off, away. 3:09-d from S., in, cleans nest to pine 6 ft away, not usual.

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June 23 (cont'd.) 3:11 d. to thicket. 3:13 - n. from S, 3 looks, in, cleans nest to another pine 7 yds off; d'n to nest, sqwks, in, looks out, out, to asp 6 ft off. 3:14 d'n to NE, n. to NW. 3:17 - n. from S, 2 looks, in; 3:18 - d. from S., looks in, n. out, silent, d. aside as no out, d. in, cleans nest. 3:22 - d'n from NE, in, looks out, back in, out to below nest, picks, to nest, 1 feed, off to S. 3:23 n from S. 1 look, in, out very slowly, to asp 6 ft off, to thicket. 3:26 d. from S, in, cleans nest. Now d'n from NE, in, out to near d. (after looking out), sqwks. 3:31 d'n from S, in, out, to NW; d. from NE, in. 3:33 - n. from NE, sqwks, d. away to NE, n. 3 feeds, off to NW. 3:35 - I climbed to the nest and looked in with mirror and flashlight. This is a limited-vision method, of course, but I could see 2 young at once; their eyes were half open and their pinfeathers were beginning to break open and fluff out. These young are about 15 days old.

4:06 - at #3 - 4:09 - A from E, 1 feed, flycatches, off to E, back, one feed, off to S. 4:12 B from W, u.r., 2 feeds, to NW. 4:17 - A from E direct, feed twice, off to E, followed immediately by B from W; 1 feed, to E. In both cases I could see the bills of young protruding from the nest hole, and there is a beating noise as though they are flapping. Their cries are clearly audible 50 yds away. 4:20 - A from E direct, 1 feed, to asp, off to E. 4:23 - B from W direct, 1 feed, off, A right to nest as B leaves, sqwk, 1 feed, off to W. 4:31 - B from E direct, 1 feed, to branch, off to E. 4:32 - same. I leave.

5:00 P.M. - at #13. First one bird came to the nest, screamed fed the young, hopped about in the dead branches. Then the other parent came up, also screaming and fed. They

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June 23 (cont'd.) are both daggetti nuchalis, fairly distinct in head striping, one more so than the other. The young must be about the same age as those in #3, or about 20 days, as both are now sticking their heads out of the nest.

The adults at all the nests show noticeable signs of wear, particularly about the head.

5:40 P.M. At #12 - bird leaves from nest. 5:44 - a d. to nest, feeds, away, screams. 5:45 - a d. to nest, 1 feed, off to W. 5:48 - d. again feeds once, came from W, away. 5:51 - both to nest, from E (d.n) and W (d.) ^{sawks} 1 d. feeds, d.n right below, d. off to W, d.n to nest, feeds, off to E, across meadow. The nest faces N. one is fairly typical d., the other "typical" d.n - fairly distinct head stripes, no black breast band. 5:55 - d. from ^E, 2 feeds, in, out with debris, glides to pine 10 yds N., whets bill, off to W. 5:57 d.n at nest, 4 feeds, off to W. 5:58.5 - d. from W, 2 feeds, dives straight down, then away? 6:01 - d. about half-way up to nest, gathering insects, working up slowly. 6:04 - d. off to W, without going to nest. I leave.

Thus, out of 9 nests in the area, #1 is the only one attended by just one bird. Oddly enough, this one is definitely an intermediate and may be an F, of n. and d. Noteworthy today is the fact that some of the young now get their heads up into the entrance and meet the parent half way. Also, n. at #7 indulged in nest cleaning several times, and I had observed that only once before.

June 24 - at #1, 5:41 ^{P.M.} - young just fed. 5:43 [↺] d.n from W, one feed, young's head half out, off to W. 5:45 - same, but off to E. 5:46 - n & d across to W. 5:47 - same as 5:43. 5:52.5 - same.

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June 24 (cont'd.) - 5:56 - same. 6:00^{P.M.} - n > d from W, 2 feeds, off to E. I leave.

- At #7, 7:12 P.M. - 3 fast visits, looks in, in, out, by d > n, d., n. in that order - sqwks at each meeting. 7:17 - d > n to nest, feeds once, sits, off to W. Now n. from E, 3 feeds, off to S. 7:18 - d. from S, 2 looks, in, out, off to S. 7:21 - d. from S, 2 looks, in; n. from S, sqwks, d. out, cleans nest; n. 3 looks, in, out, flycatches, off to NE. 7:22 - n. back, in, cleans nest to same small, close pine as he did before a day or so ago. 7:30 - d. to nest, 2 looks, in. 7:31 - n. to nest, sqwks, d. out, n. 2 feeds, to thicket, then to S. 7:34 - n. to thicket, to nest, 2 feeds, in; 7:35 cleans nest, to d.'s "usual" tree. 7:38 - n. from NE, 2 feeds, flycatches, to thicket; back to nest, 2 looks, in; 7:40 - d. from NE, 3-4 looks or feeds, n. out with faint sqwk., d in. 7:41 d > n to nest, 2-3 looks or feeds, off to W. Light is now fading slowly. 7:45 - d. out, to dead asp nearby. 7:46 - n from W, 2 feeds, to NE. 7:52 - d. from NE, 1 look, 3 feeds, in; it is getting pretty dark by the nest. Young still crying. 7:55 - d. out to dead asp 6 ft off; taps. 7:57 - d. back to nest, in. Young now silent. 7:58 - few taps. 8:00 P.M. d. cleans nest, back, in. 8:03-8:04 - tapping in nest. 8:10 - too dark at nest to see; a few Robins still hollering in the tree tops, Nighthawks, bats active, Poor-wills calling. I leave. It seems that d. probably does all the roosting on the nest; on 3 occasions at random times, d. has always been on the nest to roost.

June 25 - 7:53 A.M. at #3 - A at branch by nest, preening + screaming.

7:55 - A off to E. 7:58 - B to nest, 2 feeds, to asp, screams, off to E

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June 25 (cont'd) 7:59-A to asp from E, to nest, 2 feeds, flycatches, to pine near me (to E.) screams, away. 8:02-B to nest u.r. 1 feed, to branch, off to W. 8:03-A from E, 1 feed, off to E. 8:05-B to nest, 1 feed, to branch by nest. Now a d>n, probably from #6, to tree on opposite side from nest, hitches about. B notices, pursues d>n several times with sqwks, one or two tattoos. No body contact, just B flying next to d>n, d>n flying off a few yds. Finally they go across the meadow. 8:08-A from E, 1 feed, to branch, off to E. 8:12-B from W., u.r., 2 feeds, in, head out, looks around; 8:13-A from E u.r., sqwk, B all out, away, A 2 feeds, off to E. 8:15-B from E, 1 feed, young sticks head out, A to branch, to asp, off to E, 20yds off, taps. 8:17-B from E, feeds, off to E. 8:18-A from E, 1 feed, to branch, sits, whets bill, preens. [Chickaree is 10yds away pulling apart Bluebird nest-see Journal] 8:20-A to asps 15yds to S., off to SE. 8:21-B from E, 2 feeds, to branch, off to W, screams. 8:23-A from S, u.r., 1 feed to branch, to nest, 1 look, in, head out, looking around. Young silent now. Bluebird-squirrel controversy still on. 8:26-B from E u.r., A all out, to E, B 4 feeds, off to E. Young noisy again. 8:30 A from E, 1 feed, to branch as B from E, sqwks, B 1 feed, A to E, B to branch, then to W. 8:31.5 A from E, 1 feed, off to E. 8:35-B from E, 2 feeds, to branch, off to W. Now A from E, 1 feed, off to E. 8:37-B from E, 1 feed, to branch, to mt. mahogany 30 yds to W. 8:40-A from E, 1 feed, to branch, off to NE. 8:42 B from E, 1 feed, to branch, to s.d.a., to N. 8:45-A from E, 1 feed, to branch to asps 10-15yds S. Now B the same, but not to near A; B off to E, 8:47.5-A from E, 1 feed, to branch, off to E. 8:50 B same, but to W. 8:53-same, but A to E. 8:55-same. 8:57-same, but 2 feeds. 9:00 A.M.- B from E, 1 feed, to branch, to N. asps; 9:01-A from E, 2 feeds, to branch, B from

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June 25 (cont'd.) NE, squaks, A to W, B 2 feeds, to branch, flycatches, back to nest, feeds, flycatches, to E. 9:03- A to nest, 1 feed, off to W. 9:07- B from E, feeds once, to branch, sits, then to S. asps, 10yds off, flycatching. Now A from E, squaks from B, A 1 feed, to branch, off to W. 9:09- B from W, 1 feed, off to W. Now A from E, 1 feed, to branch to E. 9:13- B from E, 1 feed, to branch, x-wise, then off to N, at least 50 yds. 9:15- A from E, 1 feed, to branch, to E. 9:20 B from E, 1 feed, off to NW. 9:23 A from E, 2 feeds, flycatches to S. asps. 9:24- ~~A~~ B to nest, feeds, off to E. Saps. flies from W. to E, across meadow. 9:25- A from E, feeds, to branch, off. 9:28- same, to E. 9:30- B from NW, 1 feed, off to W. 9:33- A from E, 4 feeds, off to W. 9:34- B from E, 1 feed, to S. asps. 9:38- A from E, 1 feed, to branch, off to E. 9:39- B to nest u.r., 1 scream, 1 feed, off to E. 9:43- A from NW, 3 feeds, off to SW, screams. 9:44- B from E, 3 feeds, to S. asps. 9:45- off to SE. Now B from S, u.r., 1 feed, pause, off to SW. 9:46.5- A from E, 2 feeds, off to E. 9:47- saps. to E from about 75yds to SW. 9:49- B from E, 1 feed, to branch, off to SE. 9:52 A from E, 1 feed, flycatches to asp; B from N, squaks, to nest u.r., 2 feeds as A off to E. B off to NW. 9:55- A from E, 1 feed, off to W. I leave. 10:14- at #1. 10:15- bird from W, 1 feed, off to W. 10:20- bird from W, feeds once, off to E. Very rapid. I can see the heads of the young at the nest entrance, even between feedings. 10:21- Saps. across from E to W. 10:22- same as 10:20, but to W. 10:25, same, but to N. 10:27- same, but to W. 10:30- same, ^{but to N.} n.d. for certain. 10:32- same. 10:34- same, but to W. 10:37- an n slightly > d. comes to nest tree, hitches around, comes a few in. from nest, but doesn't look in; goes to other holes, other trees, then off to E. 10:38- n.d. from W, feeds, off to NE. 10:40- same, to pine 40yds to NE then to W. 10:42- same, to NE. 10:45- same. 10:47- same. 10:49- same. 10:51- same. 10:53- same. 10:56- same. 10:58- same,

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June 25 (cont'd.) Out to W. 11:03-same, but to N. 11:05-same. 11:06.5-same. 11:12-same. 11:15-same. One of the young usually makes a lunge as n>d leaves. 11:17-same, but to W. 11:20-same, but to N. 11:22- n>d from W, 2 feeds, off to W. 11:24-same. 11:25 n>d from W, 1 feed, off to N. 11:27.5, same. 11:29- young bird pokes head all the way out, looks around. 11:31- n>d from W, 2 feeds, to N. 11:32-same, but 1 feed - more looks out by young. 11:36 n>d from W, 1 feed, to W. 11:44-same, but to N. 11:47-same, but to W. 11:52-same, but to N. - young meet the parent right at the entrance now. 11:54-same, but this time the young bird got his head out to be fed. 11:56-same. 11:57.5- n>d from W, 1 feed, young not out, n>d off to W. 12:01-same, off to N. 12:03-same. 12:05-same, but off to W. 12:09-same, but to N. 12:12-same. I leave.

As the day grows warmer the young seem to get louder and more active. Those in #1 are about 22 days old; they seem to be taking an interest in the outside world. N>d is still doing all the feeding alone - d. not seen for some time.

1:30-at #3 again. These young, too, are beginning to look out between feedings. 1:35- A from W, v.r., feeds young, which comes gets head out to meet parent, then to branch, screams, crown feathers up; then to s.d.a., away. 1:37- B from E, 1 feed, to branch, whets bill. A from W. with sqwks, B away, A 1 feed, to s.d.a., flycatches off to SW. 1:45- B from E, 2 feeds, to branch, back to E. 1:48.5- A from E, 1 feed, to branch, to W. As usual, a young one lunges at the departing feeder. 1:50-same, but not to branch. 1:53-same as 1:48.5. 1:56 B from W, 1 feed, to branch, off to W. 2:01-A from E, 1 feed, to branch, to sda, off; 2:02 B from E, 1 feed, to branch, off to E. 2:07-same. 2:09- A from E, 1 feed, to branch, to sda, flycatches across to W, 2:11- B to nest, 1 feed, off to W. 2:13-same as 2:01 - to W. 2:18- A from E, ~~to~~ 1 feed, to branch, to E.

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June 25 (cont'd.) 2:19- same, but to W. 2:25- B from E, 2 feeds, to branch, off to E. Young poked head all out as B withdrew, 2:27- A from E, 1 feed, to branch, off to SW. 2:31- B from E, 2 feeds, to branch, off to E, I leave.

3:01- At #7- d. to nest from S., 2 looks, n. or d>n out, d. aside, back, in; silent; 3:03 d. out to W. Sun full on nest at this time. 3:08- n. from E., 3 looks in, out, to thicket. 3:10- n. from S. part of thicket to N, then E to nest; 2 looks, in slowly;

out, to NW. 3:12 d>n from NE, 2 looks, in, looks out, out to S. Nest now lightly shaded, 3:14 d from S., 2 looks, in; out to W, possibly with debris. 3:15- n. to nest, 2 looks, in, out, to thicket S. of nest. 3:18- d>n from W, 1 look, in, d. to nest, looks in, squaks, d>n out, ^{cleans nest beyond usual tree;} d. in; n. to nest, 3-4 looks or feeds, silent, off to S.

thicket, screams once. 3:21 d. out, to asp 6 ft off, taps, flycatcher to below nest. 3:22- n. to nest, 2-3 looks in, cleans nest to beyond usual tree, same place as d>n at 3:18. 3:25- n. from NE, 2 looks, in, out, to S. 3:26- d. from S. to dead asp, to nest, 2 looks, in, out as d>n from NE. D>n 2 looks, 1 feed, pauses, off to W. 3:30- d. from NE, in; cleans nest. 3:32- n. from 100 yds E; 3 feeds, half in on 3rd, backs out, off to SW. 3:33.5- d>n from NE, several looks, picks up (or at) insect just above nest, finally in, cleans nest.

3:37- d. from S., 1 look, in, cleans nest as did d>n at 3:18. 3:41 Jays nearby, noisy. N. to nest, 3 looks, about 10 soft screams, then in slowly, out, to NE. ~~d>n presumably still in~~ 3:44 d>n from 100 yds NE; 1 look, in, looks out, out to asp 6 ft off, then to S. 3:46- n. to nest, 3 looks, in, out to 5 yds W., then way to NE. 3:48- n. from NE, 4 feeds; d>n right behind squaks; n. to S., d>n 1 look, in, cleans nest. 3:51- n. from W., 3 feeds, in, out, to NE thicket.

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June 25 (cont'd) - 3:57 - d. n from way NE, 1 look, in; d. from S., d. n cleans nest; d. in. 3:58 - n. from NE, sqwks; d. cleans nest to a pine 15 yds SW; n. 2 looks, in; d. to S; n. out, to S. thicket.

4:02 P.M. - d. from S to dead asp, to branch by nest, to nest, 2 looks, in.

I leave. I decided to walk through the aspen groves toward Upper Place, hoping to hear young in nests that I had missed. I heard none, but on reaching nest #2, which had had 5 eggs in it but was cleaned out by a predator on about June 1, I was astonished to hear cries of young. Also, I caught sight of one of the parents, d. strongly > n, with food. The young sounded about a week old; I will have to check by bringing the mirror and looking in. If pr. #2 laid another clutch around June 1, and took 2 weeks to hatch them, this would be about the right age. There are, then, 10 pairs of sapsuckers with young in the area — that I have found. Probably there are many more to the N. and W.

4:33 - At #13. Although I watched until 5:00 P.M., I did not hear a single cry of a young bird or hear or see an adult. It is probable, then, that these young have left the nest. They were of advanced age when found; they were sticking their heads out of the nest on June 23. This will have to be checked tomorrow. There were Mt. Chickadees feeding young in a nest a few feet below #13, and they were singing as well.

The young birds at #1 and #3, at least, make a clapping sound which I think is caused by rapid opening and closing of the bill. I first supposed this was due to wings flapping but now I think not. All the young are crying unless stated otherwise.

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June 25 (cont'd.) - 7:24 P.M.; at #3 - 7:25 - A from E, 1 feed, to branch, off; screams at me, I believe. 7:26 - B from E, 1 feed, pauses, to N. asps, screams once. 7:30 - A from E to asp, screams, to nest u.r., feeds, off screaming. 7:31 - B from NE, to nest, feeds, to branch by nest, sits screaming. [A doe is snuffing loudly nearby]. B to N. asp, screams on. Now to E, 5 yds from me, perches upright in sage 18" from ground, screams. Off to E. The light is now beginning to fade - 7:35. Some big cumulo-nimbus have come up in the ^{north-}west, and there is distant thunder. The clouds have turned yellow. 7:37 - Both by nest, one on asp, other on branch. A to nest from branch, feeds once, back to it, whets bill. There is half-scream-half-squking. I do not see B now. A preens on branch; 7:41, off to E. Light is definitely fading. 7:45 - young suddenly silent; other birds, such as wrens, still noisy; it is not dark. 7:48 - I suddenly notice A at the asp, preening. now to nest u.r., feeds once, off to 20 yds E, screams. At same time B appears at branch, squks; B to N asps, tops, now out of sight, 7:50. Young noisy when parents at nest, silent now. Green-tailed Towhees still singing. 7:52.5 - B from N asps to base of nest tree; now to nest, in; whines from young, then silence. B has its head part out of the nest, looking. 7:55 - I think the head is withdrawn, but it is dark at hole. 7:58 - faint tapping in nest. 8:00 P.M. - Tapping ceases. 8:03 - all birds quiet but Pewees and Robins. 8:05 - all quiet. 8:12 - dark at nest; I leave. Sky still light, no stars out. 8:17 - a Robin sings from a treetop; Nighthawks are calling.

The heat lightning and thunder in the northwest continues, but does not seem to affect the birds.

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June 26 - 3:35 A.M. at #12, 4:10 - tapping, faint cries of young, ceasing immediately. 4:12 - more brief cries. 4:13 more. I see a saps. fly from near nest, tree, several screams, then a tattoo (answering?) from 30 yds NE of nest. 4:15 - another scream, then bird to nest from W, 1 feed, screams, ^{off} to E. The young begin crying again, not too loudly but more steadily. 4:22 - 12 screams from pine 5 yds E of nest; ^{squawks} bird then to pine 15 yds N; another up to first pine. 1st bird tattoos loudly - young begin louder cries. Then 1st bird off to W; another to its place ^{squawks} several loud tattoos - about 5 - by 4:25. Young now fully awake, crying. 4:28 - d. from pine 20 yds E to nest, 1 look or feed, to right, back in; out with feces to "tattooing" pine or one next to it. 4:30 screams; bird from this pine to one 30 yds SW of nest, then out of my sight. More screams, from NW. 4:32 - distant tattoo from W; now d. to nest from W, 5 feeds, 3 screams, off to near W, few more screams. 4:34 - another distant tattoo. 4:36 - d. to pine 5 yds E, to nest, squawk, feeds, to right, down to nest, squawk, d. off, down feeds - big hunk of insects - then away. 4:38 down back to broken top above nest, hitches about, then off at least 100 yds to S. 4:40 A.M. - 1st sun in treetops, not on nest. 4:42 - d. at nest, feeding. Seems to notice me 20 yds away, screams, glides down to about 10 yds away, gives numerous screams, taps on pine branch, preens. 4:46 - sun now on nest, at an angle, of course, as nest faces N. D. still close screaming, away at 4:48. Now d. to nest, feeds once, to left, then in, cleans nest. 4:52 - down to above nest, then to pine E of nest, chases a saps.; then to nest, feeds once, to above nest, away? Then d(?) from pine to E, squawks, feeds, then away. 4:57 - d. from SE, 1 feed, to left, in, cleans nest. 4:58 - distant tattoo; again.

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June 26 (cont'd.) d>n (#) from W, 1 feed, off to S., 5:00 A.M. I leave, just as d. again comes up, feeds, cleans nest.

At 4:10, the sky was quite light; all the stars had faded except a few bright ones near the horizon, Robins and Pewees and Empidonax flycatchers had been calling since 3:30 A.M.

6:12-A.M.-at #1-n>d from W, 2 feeds, to W. The young are noisy but do not have their heads out; it is still chilly by my standards, though.

6:15-same, 1 feed. Young now silent. 6:16-same, but 3 feeds, off to E.

Brief noise from young, silence, then faint cries or none. 6:18-same as 6:12, but 4 feeds. Young now keeping up constant faint cries.

Sun at E. edge of nest. 6:20 n>d from W, 3 feeds, few yds. to N, then off to SE. 6:22-n>d from E, 3 feeds, off to W. N>d has to put its whole head in too feed. 6:24-n>d from W, 2 feeds, to E.

6:26-same, but from E, scream, 2 feeds, to W. From now on I shall omit the "n>d" part unless, of course, d. appears again.

6:29-from N, 2 feeds, to asps few yds N, then to W. 6:32-from W, 2 feeds, to W. Sun now on nest. 6:33-same, but 3 feeds. 6:35-same, but 1 feed.

6:37-from asps few yds N (N asps from now on), 1 scream, to nest, 1 feed, pause, back to N asps, over about 20 yds E.

6:38-from E, feeds, to W. Young noisier. 6:40-from W, 1 feed, to W.

6:42-same. 6:44-same. 6:46-same; young lunged head out. 6:47-same, no lunge. 6:48.5-from W, 1 feed, lunge, to N asps, flycatches, to E.

6:50; from E, 1 feed, no lunge, to W. 6:52 tattoos from NW. 6:52.5-same as 6:50; tattoos continue. 6:56-same, but 2 feeds. Tattoos have stopped.

6:58 from W, 1 feed, to N asps, to S. asps, to E, over to W. Young noisier yet. 7:00-from W, 2 feeds, to W. Sun shifted E of nest.

7:01.5 from W, 1 feed, to NE.

7:02-to N asps, to nest, 1 feed, to E. 7:03-across to W.

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June 26 (cont'd.). 7:04 - from W, 1 feed, to N. asps, to nest, 1 feed, to NE.
7:06 - from E, 1 feed, lunge, to W. 7:08 - from N, 1 feed, to N asps, back,
1 feed, to W. 7:10 - from NW, 1 feed, to W. 7:13 - from W, 1 feed, lunge, to W.
Sun well up, but it is still cool and a chill breeze is blowing.
7:15 from W, 1 feed, to W. 7:20 - same. Young are quieter. 7:22 from
W, 1 feed to NE. 7:23 - to N asps with big-winged, long legged insect
that looks like a katydid; beats it to a smaller bundle, to
nest, feeds once, to NE; 7:24.5 back to nest, 1 feed, to W.
7:29 - saps. from E to W. Now to nest from W, 1 feed, to W. Young are
noisier again. The temperature is beginning to rise noticeably, at least
in the sun. 7:31.5 - from W, 1 feed to W. 7:34 - from N, 1 feed, to W.
7:36 - from W, 1 feed, lunge, to N. 7:36.5 - across to W. 7:38.5 - from W,
1 feed, to NE. 7:40 - from E, 1 feed, to W. 7:44 - from NW, 1 feed, to E.
7:46 - from E, 1 feed, to N. 7:50 - from NE, 1 feed, to W. 7:51 - from W,
1 feed, to N. asps, to NE. 7:53 - to nest, 1 feed, to N asps, to E.
7:55 - from E, 1 feed, to W. 7:57 - same, but from W. 8:00.5 A.M. - same.
Young much quieter again. Chill breeze still blowing, not much
direct sun around nest. 8:03 - from W, 1 feed, to N asps, to NE.
8:05 - from W, 1 feed, to W. 8:07.5 - from W., 1 feed, to NE. 8:08 - same,
but directions reversed. 8:10 - same as 8:03. 8:11 - same as 8:08. 8:14 -
from E, 1 feed, to W. I leave.

About 9:00 A.M. - at #2. I heard tapping in the nest and
looked in; one of the parents was in the nest. There was
some screeching; I started to leave and the bird came
out and screamed. I looked in again, and there were
at least 3 young, probably more, about 1 wk. old - eyes
not open, much pink skin showing, with dark specks where
the feather tracts will be. I left at once.

9:24 - At #7 - down from S. thicket, 1 feed, pauses,
off to N. Young quite noisy. 9:25 - d. at nest tree.

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June 26 (cont'd.) perches x-wise, ^{pokes} ~~poking~~ in several other holes, possibly getting insects, up to nest, several looks; then as I turned to write, d. disappeared - in? 9:27 - n. from E, 4 feeds, off to NE. 9:29 - d. must not have gone in - now from S., 5-6 looks or feeds, in; 9:30 - cleans nest to alternate tree. 9:31 - d. back to nest, numerous looks in, seems to be picking at inner rim of hole; d>n up, sqwk, d. away, d>n feeds, pauses; n. up to nest, sqwks, d>n away; n. 2 feeds, in; n. starts to come out several times, seems to struggle as though stuck, quivering all over. N. finally out, to asp 6 ft off, possibly with debris, then to NE, 9:34. 9:37 - d. from S., numerous looks and feeds, in. ~~out~~. 9:38.5 - n. to nest, about 5 looks or feeds, in. also. 9:41 - n. struggles out, cleans nest to asp 6 ft off. D>n to nest, sqwks, d. out, d>n feeds 2-3 times, off to W. Young now silent. 9:49 - young getting noisy. 9:51 - d. from S., 4 looks 1 feed, to branch as d>n comes, sqwks, 2 feeds, d. away; d>n to dead asp, taps, away - to S., I think. 9:53 - n. from NE, sqwks, 1 feed, off at least 175 yds to NE, sqwks as he leaves. 9:55 - bird to thicket from dead asp - probably d>n was there, out of sight, since 9:51. 9:57 - d. from S., 2-3 feeds; n. to branch, sqwks, d. to thicket, n. 3-4 feeds, down to thicket; sqwks; d. back to near nest, taps to nest, 2 feeds, off to S. 10:00 - d>n from S, 4 feeds, looks around, off to S. Now d. to nest, numerous looks and/or feeds, then in. 10:02 - n. from W., feeds, off to NE. d. still in. 10:05 - tapping in nest. 10:06 - d>n to nest, sqwks, aside; d. also seems trying to struggle out. Now n. from NE, more sqwks, d>n to branch, n. to nest, sqwks; d. quivers out; n. 1 feed, off to NE; d>n 3 feeds, pauses, then away.

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June 26 (cont'd.) 10:10 d. from S. to dead asp, to asp by nest, to nest tree, around its holes; to nest, looks in slightly, then above it; another saps. up now; they chase each other a few yds, silently. D. back to nest, 2 feeds, off to NW. 10:13 - yelps from thicket; tattoos from about 30 yds W. 10:15 - n. from NE, 1 feed, to W. 10:17 - d'n from E. thicket, 2-3 feeds, to asp 6 ft off, picks. 10:20 - to pines few feet away. N. to nest from NE, 10:24; ^{squaks;} 2 feeds, off as d. up to branch; d. 2 looks, 1 feed; over to d'n; squaks; d. back to nest, seems to pick at inner rim again, finally in; cleans nest to pine few feet short of usual; back to nest, rim-picking, in; 10:26 cleans nest; back to below nest, up to it, in. At 10:24, tattooing heard from W. 10:28 - d. cleans nest to alternate tree; now n. to nest; squaks; numerous looks +/or feeds, as d. off to S.; n. to branch, then to W. 10:29 - d'n to nest, numerous looks and/or feeds, with pauses between. 10:31 d'n to asp 6 ft off; must have had its head in nest 20 times, the most I have seen. Now out of sight - no; sits in "usual" pine. - now out of sight again; 2 screams from that pine, and at 10:34, squaks. 10:35 - d. from S, several looks and/or feeds, then to branch. Now n. from NE, squaks, d. away, n. 2 looks, 1 feed; squaks from thicket, 2 saps. there. N. to NE. 10:43 d'n from E. thicket to branch by nest; d. from S. to nest, squaks; d. 2 feed, scratches ear, to above nest, picks; d'n to nest, squaks, d. to W., d'n 2-3 feeds, pauses, looks around, then to asp 6 ft off, then out of sight somewhere. 10:47 - n. and another arrive at nest from different directions at same time; ^{squaks.} n. gets to nest 1st, other away. N 3 looks 1 feed, to W. 10:48 - d. from S, 3-4 looks, in. Now d'n to nest, looks in, squaks, around to trees nearby, then to thicket.

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June 26 (cont'd.) 10:53 - d>n from NE, 2 looks or feeds, to branch, d. out to W; d>n sits, then to thicket. No squaks. 10:56 - n. from E, 2 looks, 1 feed, off to N. He perched x-wise on branch before going to nest. 10:57.5 - d>n from thicket, 3 looks, 1 feed, pause, off to NE. 10:58 - n. from way NE, 1 look, 1 feed, to branch, whets bill, off to E at least 100 yds. 11:00 - 1 leave. It is still chilly in the shade and when the wind blows.

This is the first time I have seen d. go to the nest, feed, and leave without going in. The other two do this fairly often. D>n looks pale on the throat, now that some wear has occurred; D>n must be a ♀, I think. There seems to be no coordination in feeding at #7; sometimes they come and go separately, sometimes all 3 arrive at once. This seems true of the other nests too, but with 3 birds it is more evident. Noted for the first time was the occasional difficulty of ~~some~~ d. and n. in getting out, and d's action of picking or poking at the inner rim of the nest hole. Possibly the latter is actually poking at the young, in which case both actions are a result of a crowded nest, which is probable. Nevertheless, d. and n. were both in at the same time once, and they seem to feed young while another parent is on the nest.

12:50 - at #1 - ~~n~~ from N, 1 feed, to W. 12:52 - from W, 1 feed, to W. 12:53 - same, but to N. 12:55 - same as 12:52. N>d has to put his head half to all in - the young do not put their heads out as they did yesterday. 12:57 - same 12:59 - same. ^{1:02}~~12:02~~ same. [I have shifted so that I now face the nest, I can see the young stirring quite plainly, and hear their beaks clapping.] 1:04 - same 1:05 - same, with lunge. 1:16 - long wait between feedings - young are putting their heads

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June 26 (cont'd) out now; 1:17- from W, 1 feed, to N. 1:22- same, but to W. 1:23.5- same, but to N. 1:25- same as 1:22. The young are putting their heads out between feedings. 1:27- same. - now young silent. 1:29- same - noisy again. 1:31- same. 1:35- same 1:37- same. 1:40- same. 1:42 same, but to N asps, to N. 1:44- same 1:46 same. Young now putting heads out again, cheeping loudly but with an occasional immature scream. 1:49- same. 1:52- same, but from SE. 1:54- same, but from W. 1:56- same 1:58- same 2:01.5- same. I leave.

2:15- at #3. A to nest u.r., much screaming as I come up; 1 feed, to branch, to asp, more screams. 2:17 B from E; A leaves; B 1 feed, young's heads out to get it, B, to E. 2:20- A from E, 1 feed, to branch, x-wise, to W. I think I can tell parents apart as a result of difference in wear. 2:24 A from E, 1 feed, off to E, young lunges. 2:26- B (certain) from E, 2 feeds, off to E. 2:30- A from SE, u.r., ^{scream,} 12 feeds, young clutches at withdrawing beak; A to E. 2:31- B from E, 1 feed, dodges lunge to branch, to W. Now a young bird has its head out, first time seen here - 2:33 B from E, feeds it, to branch, to W. 2:35- B from E, 1 feed, lunge, to branch, ^{whets bill,} to W. Head out. 2:36- A from W u.r. 1 feed, to branch, whets bill, to N asps. 2:40- B from W, u.r., 1 feed, off to E, still with some food. 2:42- A from E, 1 feed, to branch, to NW. No heads out in last few minutes. 2:43.5- B from E, 1 feed, avoids 2 lunges, to branch, to E with some food. 2:45- B from E, 1 feed, avoids lunges, off to W. 2:46- A from E, 1 feed, to branch, to E. 2:48- A, ^{not to branch.} same. 2:50- A, same. 2:52- A, same. 2:53- B, same but 2 feeds. 2:54.5- A, same, but 1 feed. 2:58- B, same, but to branch. 2:59- A, same but to N. 3:02- B from E, 2 feeds, to N; 3:03- A from E, 1 feed, to branch, to S. asps. 3:06- A from W u.r., 1 feed; B from N, squks, 1 feed; A to branch, to E; B to W. 3:10- A from E, 1 feed, to W. 3:12- B from E, 2 feeds, back to E. 3:14- B from E, 1 feed, avoids lunges,

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June 26 (cont'd.), to branch, to W. 3:15 - I leave. A spots me and screams its head off.

3:19 - at #6. 3:21 d from E, 2 feeds, off to E - lunges by young. 3:23.5 - d. again; young lunging out, d. feeds once, is struck on head by Wren, latter much agitated. D. pauses, leaves. 3:27 - d. to nest, 2 feeds, ^{lunges,} then to feeding asp.

3:34 - d. to nest, 2 feeds, lunges, off. 3:37 - same as 3:27. 3:40 - same. 3:41 again to nest, 1 feed, to N. 3:45 - same as ~~3:37~~ ^{3:37}.

3:47 - sqwks to N, about 20 yds. 3:52 - same as 3:45, but not back to nest. Tattoo from 20 yds N. 3:57 d. still at feeding asp, tapping and drinking sap - I can see the drops at bill-tip. 3:58 - now few yds. to N, out of sight. 4:03 - d. to nest, 1 feed, to feeding asp, to nest, off to E - sqwks. I leave. D & n did not appear during this watch; I shall have to check again.

I visited #13 twice during the morning for 15 minute intervals, and did not hear or see a sign of adults or young.

The young in nests #1 and 3 are about the same age, possibly a day apart. They are so large that when one puts his head out it fills the hole. The plumage on the head and breast is sooty grey, lighter around the eye. The bill is bluish grey, much lighter at the gape. Eyes dark. The white mark from above the bill to under the eye shows plainly in these juvenals.

At #3, A is more worn about the head than B, and in favorable light they are easy to tell apart. I am sure of the identifications today.

The weather has remained noticeably cooler than yesterday, although clear and sunny throughout.

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June 26 (cont'd.) At 6:00 P.M. I went over to nest #5 and vicinity, but there was no sign of sapsuckers. This one was abandoned before egg-laying.

6:30 P.M. At #1 - young noisy, head out; 6:32 - bird from N, feeds, to SW. 6:33 - from W, 1 feed, to W. 6:35 - from W, 1 feed, to N asps. 6:37 - same, to W. 6:39 - from W, 1 feed, to W. Young lunge. Head out again. 6:41 - to nest, 1 feed, to N. asps, to S. asps, not in sight. 6:44 - from W, 1 feed, to W. 6:48 - same, but to N asps, then W. 6:50 - same, but to NE. 6:52 - same, but 2 feeds. 6:54 - from W, 1 feed, to W. 6:56 - same. 6:58 - from W, 1 feed, to N asps, to S., veers W. 7:00 - same. 7:01.5 - from W, 1 feed, to W. 7:03.5 - same, but to NE. 7:06 - from NE, 1 feed, to W. 7:07 - from W, 1 feed, to N. asps, to E. 7:09 - head part out. - from W, 1 feed, to W. 7:11 from W, to N asps, to NE. Young very loud. 7:12 - same. 7:14 - from W, 1 feed, to W. 7:18 - from W, 1 feed, to N. asps, to asp 10 ft S., flutters in foliage, to pine 15 yds SW; now not in sight. 7:21 - same as 7:14. 7:22 - from W, 1 feed, to asp 20 yds N. 7:25 - same as 7:14. 7:27.5 - from W, 1 feed to N. asps. 7:30 from E, 1 feed, to W. 7:32 - from W, 1 feed, to N asp, to SW. 7:35 - same, but to ?. Light is now fading slightly; birds begin evening song. 7:37 - same as 7:14. 7:39 - cries of young much fainter - briefly loud at 7:40 - from E, 1 feed, to W. Now cries cease, except for some faint ones starting up from time to time. 7:50 - dusk - from W, 1 feed to W. Burst of cries, then silent. 8:00 - pretty dark by nest - all quiet but a few Robins and the Nighthawks. 8:16 - dark by nest; I leave. I am sure nxd nor any other adult is not on the nest.

June 27 - 8:03 A.M. - at #3 - Young fairly noisy. 8:04 A from E, 1 feed, to branch, screams, to asp, more screams, picks, to small pine 10 ft from me, screams at me, then to E.

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June 27 (cont'd.) - 8:10-B from asp to nest u.r., screams, 1 feed, to E
8:11-A from E, to nest, may feed, to branch, many screams,
3 tops. Young quiet. The parents are so distressed at my presence,
more so than ever before, that I think I had better leave
for a while and sneak back when they have calmed down.

8:16-at #6. Young very noisy. 8:19-d. to feeding ("f.") asp
6 with dragon-fly, picks, to nest, 1 feed, off to E, and is
attacked by wren on leaving. 8:20-tattoos to NE of nest -
not very loud. 8:23-d. to nest, 2 feeds, away. As mentioned
before, there are too many other trees around this low
nest to tell anything certain about directions. 8:25 d.
from W, to feeding - (f.) asp, to nest, 1 feed, to E. I could
tell that time. 8:31-sqws-d. from E, 1 feed, to f. asp, screams.
Now tapping at f. asp. 8:33 d. to up above nest, out of sight.
8:36-sqws. 8:37-bird from N, 1 feed, to E.

8:48-at #3 again- 8:49-A from E, 1 feed, to branch, back to
nest, look or feed, to branch, to asp; B from E, sqwk,
1 feed, to branch, to E. 8:50-B from E, 1 feed, to branch,
to asp, sits, then flycatches to E. 8:52-young's head
out; A from E, 1 feed, to branch, to asp, taps. 8:53-B
from E, 1 feed, sqwk, to branch, whets bill, away. 8:56
3 B to nest u.r., goes in; B's head out, looking around 2
withdrawals, followed by looks. Then A up to nest, sqwk,
B out, to asp. A feeds 3 times; B away. A to branch,
x-wise, then to E. Young silent while B in nest. 9:00-
B to nest, 1 feed, to branch. Young looks out. B to asp, then
to E. 9:01-B to asp from E; A to nest from E, sqwks;
B to W, A 1 feed, to branch, x-wise, to E. 9:04-B from
E, 1 feed, to branch, to asp. Young looking out very
frequently now. 9:05-B to nest, 1 feed, to branch, sits.

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June 27(cont'd.) - Now A from E, squk, 1 feed, B to SW, A to branch, whets bill, sits, to E, 9:07. Young silent, one looking out. 9:09 - B from E, feeds it, to branch, to asp, to E. Noise starts as parents arrive. 9:10 - A from E, 1 feed, to branch, x-wise, off to S. asps; tattoos. Young making noise, but quieter than before. One head out most of the time, often looking down. 9:11 - B from E, feeds once, to branch, whets bill sits. Heads in; 4 yelps from B, heads out, begging. 9:13 B to S. 9:14 - bird from E, 1 feed, to branch, to E. 9:15.5 - same. 9:18 - A from E, 1 feed, ^{to branch x-wise} to S. 2 yelps. 9:19 - B from E, 1 feed, to branch, sits, picks a little. This is a dead branch, scarred by bill-whetting, picking. Heads in, sun is and has been on nest side of tree; nest frequently shaded by branches. 9:21 - A from E, squks, B to SW; A 1 feed, to branch, to SW. Cries continue, louder now. 9:27 - A to nest, 1 feed, to branch, x-wise, away. 9:28 - B to nest, 1 feed, to branch, sits. 9:29 - B chases chipmunk to ground, back up to nest level, now away or out of sight. 9:31 - bird from W, squks, 1 feed, off to W. 9:34 - head well out - A from E, 1 feed, to branch x-wise, to S asps. Now B to nest, 1 feed to branch, to asp, flycatches, to S. asps. The heads are popping out constantly - frequently the crying stops when one is out. 9:37 - B from W, 3 feeds, to asp, gets insects or sap or something, back to nest, feeds, to asp, same, then off to E. 9:39 - B from E, 1 feed, to branch; to asp; to S asps. 9:42 - A from NW, 1 feed, to branch x-wise, to SW. A branch shadow is across nest, but heads seem to come out equally, light or shade. 9:43 - B to nest, feeds, to branch, sits. ^{9:45} A from W to nest, squks, B to W, A 1 feed, to branch, to E. Young quite noisy. 9:47 - B from W to asp, to nest, 1 feed, to branch, to E. 9:50 - B from E, 1 feed, to branch, to 65 yds SE, to big yellow pine.



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June 27 (cont'd.) 9:55-A from E, 1 feed, to branch, to E. 9:56-B to nest, 1 feed, to branch, away. $\frac{1}{2}$ way between nest and ground. 9:58-B to SW. 10:00-bird, I think A, from E, 10-11 feeds, to branch, ~~young's~~ young's head out, begging; to asp, to SW. 10:02-B to nest, 2-3 feeds, to branch, off to E. The 10:00 bird was A for sure. The young have their heads out, one at a time, most of the time now. 10:06-A from E, big hunk of food; 4 feed attempts, to asp, beats food, back to nest, 24 more attempts, to branch, beats food again, back, about 5 more tries, as B from W to branch, squaks; I think A successful, to above nest, B to nest, A to E, B 1 feed, I think not to branch, off to big pine 30 yds E, flycatches to NE. 10:11-bird from asp to E-I must have missed a visit. 10:14-B from E, 1 feed, to branch, to SW. 10:16-A from E, 1 feed, to branch, to thoroughly dead branch of asp, taps at it from several angles, perhaps sharpening beak? This branch is hard-no wood borers in it. Now away. 10:20-B from E, 1 feed, to branch, to N. 10:22-B, same, but to W. 10:23-A from E, 1 feed, to branch, 1 scream, to E. Young quieter now. 10:26-an n., not n. of #7, to asp, to branch, below nest; seems to see B coming, off to SW. B from E, 1 feed, to W. All silent but young, which are very noisy again. 10:28-A from E, 1 feed, to branch, flycatches to N. asps. 10:33-~~2~~ 2 screams from E; A from E, 1 feed, to branch, more screams, to S. asps, several more screams. 10:35-adults quiet; I leave.- sun on nest, heads in; very noisy. 11:05-at #1 Young noisy, head out. 11:13.5-from W, 1 feed, to E. 11:16-from E 2 feeds, to N. 11:¹⁸~~23~~-from E, 1 feed, to W. 11:20-young's head out, cheeps and immature screams. Young bird half-out, then back to just head out; more of same. 11:29-from N, 1 feed, to E. 11:31 from E, 1 feed, to N. 11:33-same; young meet parent with head out. 11:35 same, but from W.

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June 27 (cont'd.) - 11:37 - same, 2 feeds. 11:39 - same, 1 feed. 11:40 - same, but to W.
11:45 - same, but to N, 11:47.5 - same, 11:49 - same, but to W. 11:51 - nxd
flycatches about pine 65 yds to N, then to W. 11:52 - from W, 1 feed,
to small pine 60 yds N. 11:53.5 - same, but to W. 11:56.5 - same, but to N.
11:57 - across to W. 11:58 from W, 1 feed, to N. 11:58.5 - from N, flycatching
on way, back 100 yds n. after 1 feed. Now to pine 65 yds N, then
to W. 12:00 - same, flycatching to and from, but not to W. - to N again.
12:02 - across to W. Young quieter. 12:03.5 - from W, 1 feed, to 65 yd
N pine, flycatches from it. Young silent. Nxd across to W. Young
start crying again. 12:04.5 - same, but not to W, to nest from N,
off to N. 12:05 - same, to N. I leave.

1:25 - at #11. Young cheeping loudly. 1:28 - d'n to below nest,
picks at a hole, to nest, looks, not in, away. 1:30 d. to
nest, 3-4 feeds, in, cleans nest to asp 50 yds S. 1:33 -
d'n to nest, 1 feed, to E. Now 2 more rapid feeds I could
not follow, 1:35. Now D'n 1 feed. 1:36 - same; then again, I
think d. 1:37 - another feeding. 1:42 - d. to nest 1 feed. The
young are not visible from this $\frac{3}{4}$ view - just an occasional
beak-tip. Both birds feeding, clearly.

^{1:52}
~~1:52~~ at #3 - 1:55 - A from E, 1 feed, to branch, x-wise, off. Now
B to nest, 1 feed, to branch, to E. A spots me and starts screaming -
I am 50 yds SE of the nest, under some pines. 1:57 - A from E, 1 feed,
to branch, to E as B dights ~~under~~ below A; B to nest, 1 feed, to
branch, to S. Nest side of tree shaded - young with heads out.
Not very noisy to my ear, but it is rather windy now; also hot.
2:03 - B from E, 1 feed to branch - young's head out - to young
feeds (I guess), to branch; repeat; then to SW. 2:09 - A
from E; 1 feed, to branch, to W. 2:11 - B to asp, to nest, 1 feed, to
branch, to NE. 2:12 - A from E, 1 feed, to branch, to below nest,
whets bill, to S. 2:13 - young half out, withdraws.

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June 27 (cont'd.) - 2:15 - B from E, I feed, young's head to meet it, to branch, flycatches to N. asps. 2:16 - bird from E, I feed to branch, to E. Saps. out flycatching over meadow 60 yds to S. 2:18 - B from E, I feed, to branch, flycatches to S. asps. 2:24 - A from E, I feed, to branch, to N. Now I hear a few imm. screams from these young, as from those at #1. 2:27 - B to asp, to nest, I feed, to branch, whets bill, to E. 2:33 - A from E, I feed, to branch, whets, to asp, hits on dead branch, off. 2:35 young all inside. 2:42 - head out again - now bird to nest, I feed, to branch, to S. asps, screams several times. 2:45 - B to nest, ^{I feed} to branch, young begs, B to E. 2:49 - bird from E, I feed, to branch, young begs, bird off to N. 2:53 - A from E, I feed, to branch, x-wise, screams, to SW. I leave.

3:00 P.M. At #6 - d. from f. asp to nest, 2-3 feeds, to E; back to f. asp, 3:01. Young very noisy, but no heads out. 3:04 - d on big pine right by nest, 2-3 screams. 3:06 - d. to nest, I feed, to f. asp, to N. 3:09 - d. to nest, 2-3 feeds, young lunge, d. to f. asp. 3:12 - d on from big pine by nest to nest, heads of young out to get the food, 2 feeds, d on to E. D on had been in this pine gathering insects and screaming at 3:11.5. 3:14 - d on from E, same, to branch to E, x-wise, then farther E. 3:19 - d. from N with dragon fly to f. asp, either beats fly or smears it with sap, to nest, feeds with much shoulder-hunching, young lunging, d. off to E. 3:24 - d. from W. to ~~to~~ f. asp, gets sap, I think, to nest, feeds lunging young, is struck on side by wren, goes to asp by f. asp, screams, then to N. 3:28 - d on to f. asp, sap-gathers, then as at 3:14. 3:29 d. to nest, feeds, to f. asp, sap-gathers. 3:30 - I leave. It is

11 certain that both parents are feeding. As I pass #10, I see a parent at the nest and the young lunging at the food.

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June 27(cont'd.) 3:45 P.M. - at #8 for a brief watch. I was seen by dsn, and the bird screamed loud and long. Finally I got out of sight and watched. Between 3:45 and 3:58, dsn made 2 visits to the nest and d. also 2 visits. The young had a head out most of the time, and I heard a few imm. screams. These are about the same age as #1 and #3, or about 24 days.

4:05 P.M. at #1. 4:06 - nd to left of nest, not to it, looks, flies over just over my head, then to W. Silent. I am 20yds to the NW. Young very noisy, heads in and out. Some imm. screams, mostly harsh cheeps. 4:12 - from W, 1 feed, to W. 4:16 - from W, 1 feed, to N. asp, to S, asp, to E. 4:17 - across to W. 4:18 - from W, 1 feed, to 10 yds W, out of sight to W. 4:28 - from W, 1 feed, to NE. Young noisier than just before feeding, few "screams" 4:30 - from E, 1 feed, to W. 4:31 - from W to N. asp, to nest, 1 feed to longer, to E. 4:32 from E, 1 feed, to E. 4:33.5 - same. 4:35 - across to W. 4:36 - from W. ~~to~~ 1 feed, to N asp, to E. 4:45 - from W, 2 feeds, to W. 4:49 - from W, 1 feed, to W. 4:51.5 - from W, 2 feeds, to N asp, to W. 4:55 same as 4:49. 4:58 - from W, 1 feed, to N asp, to SE, around to SW. 5:00 P.M. I leave.

The noteworthy features today are the fact that the young have their heads out (one ^{bird} at a time) most of the time, and that they are starting to make more adult noises, i.e., screams. The parents seem a bit more nervous, and in some cases (#1) feeding seems to have slowed a little. I don't think #s 1, 3, and 8 will stay in the nest much longer - there can't be much room, in fact. Both parents are active at all nests except #1 of those checked today.

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June 28 - 3:40 A.M. at #10 - nest just barely visible; stars out.

4:01 - 2 distant tattoos - fairly light now. 4:07 - few faint screams.

4:11 - A to branch from W; faint sqwks, B out of nest, to N; A to nest, looks in; then B out, probably cleans nest.

4:16 distant screams and sqwks, from SW. Young not audible.

4:17 - B from W, in, looks out, back in, cleans nest; now bird from W. to branch; A from S, sqwk, bird leaves; A to nest, in, cleans nest. 2-3 tattoos heard in last few minutes.

4:23 - B from NW, in. 4:24 - A to nest, sqwks, B out, to Pine, A in.

Tattoos from S., not from this pri. 4:27 - more tattoos from S.

4:30 - A's head out, looks around, draws back in. 4:36 - same,

then again. 4:40 - tapping in nest, brief. 4:42 - same. 4:43 - B from S., to branch, to nest, sqwks, A out, B in. Sun just getting into treetops.

4:47 - young faintly audible; I am about 20 yds away, facing nest. 4:49 - ^A B to nest from SE, in; B must have

come out without my seeing it. A out again, to a nearby branch, sits, down to S.; 4:51 - back to nest, in, out, to W. Screams and tapping from W. Young quiet again.

4:55 - B from W, in; small patch of sun reaches nest, rest of tree shaded. 4:57 - A to Pine, to nest, sqwks, B out to N, A in, out, down to W. Young faintly audible again. 5:02 - young louder.

5:04 - B to right of nest from N, to nest, in, looks out, out to same branch as at 4:49, away; 5:06 - bird (same?) from S, to same branch, to Pine, to nest, in. Young not audible.

5:10 - tattoos to S. 5:15 - A to branch, to nest, in, out, straight down, out of sight. I leave. Young still inaudible - no wonder, for it is very, very cold. At 5:17, just as I was going, both birds arrived at the nest; the 2nd to arrive went in, the other (1st) away; the 2nd went in, came right out, flew down and off to the NE.

1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 26

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Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

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Crowder Flat, 5200ft, 38mi. NNW of Alturas, Modoc Co., Calif.

June 28 (cont'd.) 7:40 A.M. - at #1 - young heads out, cheeping and screaming. 7:42 - from W to N asp, to nest, 1 feed, to E. 7:42 - from E, 1 feed, to E. 2 screams from a few yds. E. The sun is pale because of light clouds, and it is quite chilly. 7:45 - from E, 1 feed, to pine 10 yds N. Young suddenly silent, now start up again. 7:48 - from W. to N. asp, to nest, 1 feed, around nest tree, to W. - seems slightly nervous. Young have withdrawn. 7:54 - head out, young silent or faint. 7:58 - head withdrawn; then, same as 7:42; young noisier again. 7:59 - from E, 1 feed, to N. asp. As always, when the parent arrives, the cries increase sharply in volume and shrillness. N>d must have gone to W; 8:00 A.M., from W, 1 feed, to N asp., to E. 8:02 - from W. with dragon fly, young head out to get it, off to W. Now head out, young noisy. 8:04 - from W, 1 feed, around back of nest, to E. Heads withdrawn. 8:06 - from W, 1 feed, to W. 8:07 - from W, to N. asp to nest, 1 feed, to E. 8:07.5 from E, 1 feed, to E. 8:09 - from E, 1 feed, to W. - head out, young silent. 8:12 - from W, 1 feed, young lunges half out, to E. 8:13 - from E, 1 feed, to W. Heads withdrawn. 8:15 - from W, 1 feed, to W. Head out, noisy. From now on I shall mark just direction, no. of feeds, like this: W-1-W, for the 8:15 sequence, 8:17 - to nest-1- N. asp - ? 8:18 - E-1-E. 8:19 - same. 8:20 - same - young lunges half out. - n>d at mt. mahogany 25 yds E. 8:20.5 - E-1-W. Young screaming, head out. Sun much brighter. 8:24 - W-1-N. asp, E. Young lunged half out. Clouds over sun. 8:25 - E-1-W. 8:26 - W-1-E. 8:27 - E-1-N. asp - E. 8:28.5 - E-1-W. 8:30 - W-1-W. 8:32 - W-1, to dead asp 6 ft E, x-wise, to ground, flycatches, to W. 8:34 - W-1-E to mt. mahog. 25 yds. 8:35 - E-1-W. 8:36.5 - W-1-W; young strikes n>d with lunge, jars n>d. 8:40 - W, to E side of nest, young $\frac{2}{3}$ out to get food; n>d to E. 8:41 - from E, same action, 2 feeds.

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June 28 (cont'd.) - 8:42 - A young bird comes out, flutters to ground at base of N. asp, nxd seems to coax it up the trunk of the N. asp, hitches about, cheeping and begging. Nxd very attentive, squking, feeding ~~often~~ ^{tattoos once,} often, stays near for 4 min, then to E. others still in, but one with head out, few screams. 8:45 - all silent. 8:46 - young half out, withdraws. 8:47 - W-1 - N. asp, looks at but does not go to young, E. 8:48 - E - N. asp, squks - to nest, -1 - W. The "out" bird picks at N asp - a dead one - 2 ft above the ground. 8:49 - W-1 - N. asp, to young, does not feed, then to W, making soft squks on wing, flying slowly. "Out" bird silent, picks at a rotten-looking spot. Other young alternately noisy and silent, head of one out; mostly cheeps, some screams. 8:57 - "out" - hitches up to 4-5 ft high, picks, sits. 8:59 - E-1 - N asp, squking, x-wise, "leads" the out young to the next asp, up to 6-7 ft high. 9:01 - E-1 - N. asp, E. Young comes half out, withdraws. "Out" to 10 ft, picks. 9:06 - head withdrawn, young noisy. ² Screams from "out" bird. 9:08 - W-1 - W; ignores "out," who has hitched 2 ft higher. 9:14 - young still noisy, withdrawn; sun out but pale through haze; cool wind. Out bird preens, now taps on bark of healthy aspen. 9:18 - head out, loud bill-popping from within. 9:19 - W-1 - N. asp - squks + yelps, much x-wise perching - "out" works toward nxd, fluttering and x-wising, flutters to another dead N. asp, few screams, cheeps. Nxd to W, squking. 9:22 - W - N. asp - nest-1 - W. out has hitched to 15 ft. 9:24 - W - N. asp - squks, may feed out - call it #1 - ~~to nest~~ not to nest, to W. 9:26 - NE - W asp below #1, to nest-1 - W. 9:28 - #2 ²/₃ out, pulls back in. Now from W-1 - to big ~~asp~~ pine 15 yds W; #1 screams, nxd yelps, to #1 - squks, nxd back to pine,

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(cont'd)
June 28 - farther W., squking. #1 hitching up to 18-20 ft, on branch of dead asp. withdrawn at nest. 9:31 - #1 down 2 feet, fluttering. N>d from W, feeds #1 - W. not to nest. 9:33 - head out at nest, cheeps + screams. 9:35 - W-1- to #1, over to 15yd W. big pine, squks, #1 flies over to it, down to farther W, more squks. 9:37 - W-1- ~~to the~~ #1 flies to Nest tree, in top; n>d to the pine, yelps + squks, to farther W., back to pine, more yelps, then 20yds onto W. seems to be trying to draw #1 to W, perhaps where n>d gets most of the food. #1 over in the pine, picking. I am going to take a chance and go for the shotgun. Now ~~#1~~ ^{n>d} is trying to draw #1 farther W, yelping. #1 works out W branch of pine. 10:10 - back at nest, young with its head out. screams (adult) from near W. 10:13 - I can hear #1 and n>d in a big pine about 40yds W, and about 40 ft up. 10:20 - #1 now about 50 ft up; n>d attentive - from W to #1, again, #1 screams, n>d squks + yelps. - 10:21 - same. 10:25 - same. 10:30 - W-1- flycatches to S - to W. 10:31 - W-1 - N asp, N. Young then $\frac{2}{3}$ out, pulls back - 10:32 - squks - N-1 - N. asp - E. 10:33 - in W., with food - 2 yelps - #1 screams - n>d to farther W. 10:35 - yelps - feeds #1, I guess - branches obscure view. 10:36 - to #1 again. 10:38 - W-1 - W. 10:40 - same, yelps on passing #1's tree. 10:44 - W-1 - W. 10:47.5 - E-1 - E. 10:48.5 - E-1 - W. 10:50 - W-1 - W. 10:52.5 - E-1 - W. 10:54.5 - W-1 - E. 10:55 - E-1 - E - young lunges $\frac{2}{3}$ out. 10:56 to W, ^{yelps,} attends to #1 in same place. #1 screams. 10:57 - from E-1 - W. Young gets $\frac{1}{2}$ out several times, pulls back. 11:00 - same. 11:04 - W-1 - W. 11:08 - to nest - 1 - E; to Nasps, squks; E-1 - W. 11:12 - I can hear #1 screaming - n>d also, same place - n>d yelps. Nest young scream too. - 11:15 - now silent - more

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June 28 (cont'd.) screams, yelps from both places, interspersed with silence. 5 mi. silence - one $\frac{2}{3}$ out twice, pulls back in - loud cheeping. 11:31 - W-1-W. 11:33 - same 11:35 same, more $\frac{2}{3}$ outings, cheeps + screams. 11:39 - W-1, -N-2 stops on way. 11:42 - N-1, N, 1 stop. 11:55 - W-1-W; #2 pops out, flies to the 15 yd. W. pine, screams; picks, scratches. Another head out of the hole, cheeping. 11:57 - nrd from W to the pine, with food, sqwks, to nest - 1 - back to the pine above #2, much x-wise, sqwks. #2 preens, screams; almost invisible from back - about 12 ft up. 12:07 - #2 to a small pine 10-15 ft away, taps, screams. #2 flies and hitches well - better than #1 did. Now about 8 ft up. 12:11 - W-1-W; #2 ignored. #2 still hitching about, picking or tapping, screaming. 12:14 - W-1 - N+E - sqwk - to nest - to #2's tree, low, starts up, off to W. No yelps, etc. 12:21 - W-1 - N. asp, - E. Both 1 + 2 quiet. Now sqwking - nrd from E, flutters around, over to where #2 last in sight. 12:28 - W-1 - N; I have been up looking around, and nrd comes up and screams at me. I think I will see more sitting quietly in one spot. 12:30 W-1-W. 12:33 - W-1 - ? 12:35 - W-1 - N; W. 12:37 W-1 - N asp, to 15 yd. pine - screams from #2? - to farther W., yelps - W. Both 1 and 2 have almost pure sooty heads, but this #3 poking its head out has a distinct white post-ocular stripe. 12:48 - W-1 - N. asp - W. 1:20 - back at nest #1 - #3 or one like it has head out, not very noisy. Cloudy but hot. Other birds of all sp. quiet. 1:22 ? - 1 - W. 1:25 - W-1 - W. 1:31 - #3 screams, "answered" by screams from where #2 last seen. Now 3 cheeps violently. 1:34 - W-1 - 40 yds SW. 1:44 - to 15 yd pine, screams, to N. asps, screams, to nest, screams, 2 feeds, to W, screams. All quiet but a chickadee and the young saps. cheeping. No sound from 1 and 2, or nrd.

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June 28 (cont'd.) Heads in much of the time. 2:10 - screams from nest, screams from 50 yds SW. 2:15 - 3 screams from W. 2:17 - W - 1 - mt. mahogany 40 yds E. 2:19.5 - E - 1 - 15 yd. pine. 2:29 - W - 1 - W. Young withdrawn most of the time. 2:30 - I doubt if this bird will leave very soon - I am going to check #s 8 and 3. 2:31 - W - 1 - W; screams (adult) from 40 yds W.

2:53 - at #3. I passed #8, was screamed at, heard a young bird in the nest; at #11, a parent was feeding, the young very noisy. At #3, I was screamed at, and a young bird has its head out, cheeping. B. from E, 2:55, 1 feed, to branch, screams, hitches down on branch, continues screams, flycatches, to tiny pine at base of nest tree. 2:57 - B flycatches to s.d.a., to N asps. 2:58 - A from W, u.r., 1 feed, to branch, to asp, screams about 20 times, to big pine 20-25 yds E, more screams. 3:00 - B from E ~~to branch~~, 1 feed, to branch, to W. Young silent for past 5 min., head out and in. 3:02 - young cries out as A crosses to W. 3:05 - young withdraws, cheeps start again; now head out, cheeps. 3:07 - A to asp, to nest, 1 feed, to branch, x-wise, screams, to asp, taps, screams, to N, screams. 3:08 - B to nest, 1 feed, to branch, screams, flycatches to s.d.a., to E. Young withdrawn. 3:11 - A from E, 1 feed, to branch, to E. 3:16 - B from E, 1 feed, to branch, to E with scream. 3:20 - A from E, 1 feed, to branch, young begs, almost silently, A to W. Head out, silent; $\frac{1}{2}$ out twice, back to head out. 3:23 - A from W, u.r. 1 feed to branch, to E. Now young withdraws, silent; 3:27 - B from E, 1 feed, to branch, to E; young's head out, cheeping. 3:30 - A from W, u.r., young pulls back, A 1 feed, to branch, x-wise; B from E, A to E, B 1 feed, to branch, to E. Head out again, cheeping - no screams yet. 3:32 - B from E, ~~to~~ 1 feed, to branch, to E; B same, but to W.

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June 28 (cont'd.) 3:36-B same, to E. Head in, much cheeping. 3:37-A same, but from W. 3:39-B from E, 1 feed, to E. 3:40-A from E, 1 feed, to branch, to W. It is very windy. 3:42-head out again; 3:43, withdrawn. 3:45-head out again, in again; 3:48-B from E, 1 feed, to branch, to E; 3:49-A to nest, 1 feed, to branch, screams, to S asps, screams. Head withdrawn; 3:50-B from E, 1 feed, to branch, to E. Head out, silent. 3:51-B from E to asp, scream, to nest, 1 feed to branch, to E. Head out, cheeping. 3:52-A from E, 1 feed, to branch, screams-head withdrawn-to asp, screams, few taps, lots of screams. I leave. As I pass #6, a parent is feeding young in the nest.

4:07-back at #1-nrd passes me, screams, continues to nest, feeds, screams some more, then to S. Young has head out, mostly cheeps, a few screams. 4:11-from E, 1-W. #3 (or like it) shakes head violently, as though infested with something. 4:13-W-1-W.; head withdrawn. 4:15-same. 4:24-W-1-to 15yd. pine, to SW. Head was out just before feeding, now back in. 4:26.5-W-1-W. 4:28-W-1-around tree, -S.asps, -SW. 4:30-W-1-W. 4:31-W-1-around tree, to 40 yds W, across to E. sunny, but very windy. In the afternoon the sun is on the W. edge of nest #1. 4:38-screams from W. 4:41-?-1-to big pines 30 yds W with harsh screams; then on W. 4:50 young withdrawn, silent; then nrd from W, 1 feed, to 15yd. pine, to W. Young cheeping again, head out now. It is beginning to get cool. 4:52: W-1-W. 4:53.5-same. 5:00 P.M.-W-1-NE, across to W. 5:01.5: W-5 looks or feeds-W. Head out, cheeps + screams; 5:03 W-1-N asp, -SW. 5:06-W-1-W. 5:09 young withdrawn, quiet. Yelps in W. 5:10-young noisy again. Screams within 25 yds; nrd is there on a dead asp to SW, about 4 ft up. 5:15 to pine 10 yds N, to 40-50 yds W.

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June 28 (cont'd.) screams continue. 5:17 - in pine 50 yds SW, then to SW dead asp again, back to pines. Attending to young #s 1 and 2? I don't see them. 5:25. SW-1-40 yds W. 5:30 P.M. I leave. On the way I stopped at a clump of mt. mahogany 75 yds W where nrd often feeds, but I did not see either of the "out" young there, nor even nrd in that few minutes.

To sum up today so far: I saw two birds leave nest #1, and at least one is still in it. Nrd showed great concern over the first that I saw come out, much less over the 2nd. The parent seemed to try, successfully, to lead the young up and to the west. In the meantime, feeding at the nest continued at the usual pace at times, but with some long interruptions, probably while nrd was attending to the other young. Nrd seemed so excited when the first young left that it gave a tattoo on an N asp.

It is a pity I could not be at #8 and #3 also, as I feel sure some of their young left too. At #3 feeding was continuing at the usual rate, both parents participating. I had only an hour at this nest, and I have no way at all of being sure that any young left. Those from #1 made themselves completely inconspicuous within a less than an hour after their exit. They seemed perfectly able to care for themselves, and were quite large - except for the grey head and slightly shorter tail, they looked like adults.

It is clear that the semi-mixed pair, nrd and d at #1, have brought at least 3 and probably the

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June 28 (cont'd.) whole brood of 5 to the nest-leaving stage. This is more remarkable in that nxd bore the burden alone for the last few days. The evidence seems to indicate strong fertility and viability of dxn. mixtures.

6:40 P.M. - to #12, briefly. I could hear the young plainly, and could see a head sticking part out for a few seconds. One of the parents came to feed, fed once, screamed, and went off. I would guess these young are about 22-23 days old.

7:48 P.M. At #3 - B from nest or by nest to asp, screams until 7:51; then to nest, in. I can hear faint murmers of young as B goes in. It is now dusk; the sky is mostly overcast, and it is still windy. At 8:13 it is too dark at the nest to see, so I go over to #6 and look in with mirror and flashlight. As soon as the light shines in the young start cheeping. Then I get a good glimpse of the bright red head of an adult which is roosting on the nest. Now the adult starts a harsh scold, and I leave, 8:17 P.M.

June 29 - 4:20 A.M. - no ice, but great snakes, is it cold!

Weather clear. A few very brief cries from young, and an occasional head well out. I heard a few distant yelps and what I think were cries of #1 and/or #2.

4:46 - sun in treetops - tattoo from SW; again twice. 4:50 - loud cheeps few screams from nest. 4:52 - quiet; ~~now~~ now noisy again. 5:10 - Walking around about 75 yds SW, I scare up one of the young in some small pines - it screams a few times, then sits quietly. Tattooing in distance.

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June 29 (cont'd.) - screams, and n>d appears a few yds E. Loud cheeps and screams from nest. N>d to nest tree, tattoos. Then to N asps, then to nest, 1 feed, back to N asps, taps. 5:32 Scream - E - I - E. 5:34 - sqwks + imm. screams from N. asps or a little E - a young one appears in N. asps; n>d from E, sqwks, feed it, yelps off to E. Young one about 12 ft up. More screams + sqwks - this bird acts just out - it could have popped out while I wrote. More cheeps + screams - the young one is 25 yds E in juniper - mt. mahog, n>d attending. 5:45 - now the young in nest makes several $\frac{2}{3}$ outings, comes out, flutters to dead asp 10 yds E. This one has definite head stripes. It gives a light, just recognizable tattoo; picks. N>d has not seen it. No sound from nest - last one? 5:50 - n>d again attends the "thicket" ^{cheeps.} young. ~ No sound from other. 5:53 - more thicket cheeps. 5:55 - cheeps and screams from the head-stripe young. 5:58 - more attention to thicket young - I can see fluttering. Other is tapping. 6:00 - ~~other~~ cheeps in thicket; other 1 scream. 1st is about 20 ft up a juniper. 6:04 - more cheeps from thicket - the other young is giving a few screams, moves to a tree a few yds. farther E. I decided to collect them now, while I had a chance. I got n>d, and these 2 young. Later, I got another young bird about 40 yds S. of nest #1, which is probably of that brood. The nest is completely empty, with a few remnants of what look like chitinous insect parts.

Next I went to #8; the nest was empty, but both parents were around, screaming. This was a fine chance to collect both with certainty, which I

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June 29 (cont'd.) did. Between #8 and #1 I noted at least 2 more young, and I'm fairly certain I heard an adult. As I had no way of knowing the origin of these young I did not collect any. They were in small pines, tapping and screaming occasionally. They are certainly well-camouflaged when quiet.

8:45 - on way to #3, about $\frac{1}{2}$ way there from Twin Spring, a perfect ♂ nuchalis came up to a pine about 10 ft. high right by me. Up and down the tree he worked, trunk and branches, gathering big ants. Then he flew off to the S.

9:00 A.M. Parents around scolding, especially A. One young out, hops and flaps about in nest tree, then flutters out and flies 75 yds NW to the other side of the meadow. Both parents near nest now; B feeds a young in the nest, then to E, A up to asp, screaming and tapping, preening 9:05. 9:10 B from E to asp, to nest u.r., I feed, to branch, screams, preens. I move to a less conspicuous place. 9:15 - A to nest, I feed, to branch, to asp. still at least one young in nest. 9:20 - B from E to A at asp, squks, A to E, B to nest, I feed, to branch, to S. Young cheeping, withdrawn. The one that left to the W., does not seem to be getting much attention, but it is out of sight to me. 9:23 - A from E, I feed, to branch, x-wise, to S. 9:25 - A from S., u.r., I feed, to branch, to E. 9:26 - B from S., to asp, I feed; cries of young from NW; cheeps, yelps from adult(s), screams from young - obviously being attended - B to that direction. 9:30 - A to nest, feeds, while sound of parent and young come from NW. Now a tattoo; more yelps. 9:33 - B from E, I feed,

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June 29 (cont'd.) to branch, to E. Young head out now, cheeps.
9:35- B, same. Young several half-out fries. 9:39- B from E,
1 feed, to branch, to S. 9:42.5- same, I think B. 9:44- same,
screams at branch. 9:45- B from S to asp, to nest, 1 feed, to
branch, to E. 9:46- A ~~to nest~~ ^{to nest} ~~from E~~, 1 feed, to branch, screams, to asp,
screams. 9:51- B from E, 1, to branch, to E. 9:53- A from E,
1 feed, screams, to branch, x-wise, to E. Young in nest screams
once. 9:55- B from E, to asp, to nest, 1 feed, to branch; A
from E, squks 1 feed; cry from young in N. asp; yelps
from B; both over to the young, more screams + yelps.
Young flutters + climbs to topmost branches of 35 ft. asp,
"led" by one parent—then flies to SW, out of my sight.
More yelps, screams. Bird in nest, $\frac{2}{3}$ cuttings; 10:00-
A to nest, screams, feeds, to branch, screams, to E. B
from E, 1 feed, to branch, to S, 10:03. Young now withdrawn.
10:03.5- B from E with squks, 1 feed, to branch, to SW. Head
out now. 10:05 A from E, 1, branch, to where young was in N.
asp, to W. 10:07- A from W, 1, branch, x-wise, E. 10:10- B from
E, 2 feeds, to branch, to asp, back to nest, in, head out.
10:13- A from E to branch; faint squks, pause, B out, to
branch, to asp. A to nest, feeds, to branch, B to E; A to
asp, screams, sits, 10:15. 10:16- B from E to asp, squks, A to
E, B to nest, feeds, back to asp, preens. 10:20- ~~A~~ to N asp,
A to branch, to N asps; squks; both to SW, where screams
and cheeps of young heard. Yelps. One in nest head out,
few screams. Now series of adult screams; A from N to
asp, many screams, "answered" from NW; 10:25- A to E;
screams stop. 10:28- A from N, 1, branch, N asp. 10:33- A from
N, to asp, to nest, 1 feed, ^{to branch} screams, to E. 10:34- B to nest
feeds, to asp.



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June 29 (cont'd.) - 10:41 - at #6 - young cheeping noisily. 10:43 - d. to nest, feeds, to E. Heads in + out. 10:47 - bird to nest, 1 feed, to f. asp, feeds or gathers; away. 10:50 - bird to nest, 1 feed, to E - fast. 10:53 dsn from E, 1 feed to E. 10:55 - dsn to f. asp, picks; d. to nest, feeds to f. asp by dsn - squaks - dsn to nest, feeds, to E; to nest again, feeds, to f. asp, to E, 10:57. I leave.

At about 11:15, at Twin Spring, I heard young sops. and located a nest about 50 ft up in the dead top of a big pine, most of which was in needles and bearing cones. A daggetti came up and fed - the young sound about 15-20 days old, maybe more. The parent had been at a well-worked mt. mahogany about 75-100 yds away. This is #14, right at Twin Spring.

3:59 P.M. - at #3. At least one young in nest, cheeping, head in. 4:00 - A from E, 1 feed, branch, S. Head out now, silent. 4:04 - A to nest, 1 feed, to branch, sees me, comes over screaming. 4:05 - B to nest, feeds, to branch, to asp; to nest again, feeds, to asp, to E. Now young's head out, screams. Scream from parent and loud taps, from 50 yds E. 4:13 - A to nest, 1 feed, to branch, screams, to asp, away. Now yelps and adult screams from W. side. 4:19 - A, B both to asp, to branch and nest from NE; A to nest 1st, feeds, to E, B same. 4:21 - A from E, 1, to branch, x-wise, to SW. 4:24 - B from E, 1 feed, branch, N. asp, taps. Yelps from W. 4:27 - A from SW, to asp, to nest, 1 feed, to branch, to E. 4:30 - I leave. On the way I went to the mt. mahogany clump which this pair seems to have used often for feeding. A was there and

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June 29 (cont'd.) screamed at me, but there were no young in this clump. Then, about 30 yds above and W. of #6, I saw a dsn working up and down a little pine just as I saw a nuchalis do this morning. Then it went to a well-drilled mt. mahogany and either drank sap or gathered insects. There were ants and other insects in both trees.

4:45 P.M. - at #¹¹~~6~~ - young cheeping loudly, no heads out. 4:47 Parent feeds, then over to pine 30 yds E, taps, preens. 4:50 - to farther E. 4:51, 4:52 - parent feeds, then to SE, to NE. 4:52.5 same as 4:51. Between 4:53 and 5:00 P.M. the young had 9-10 visits, both parents participating about equally. Except for a parting lunge, the young keep their heads in during this brief watch. Parents come and go to and from any direction, mostly E. 5:03 - feeding rate maintained while I write - at least 4 feeds in 3 min, both birds active.

5:15 - at #14 - young cheeping. 5:20 - dsn from NE, 1 feed look away. Young silent, then cheeping again. 5:22 yelps from W. 5:23 - dsn feeds again, down, by way of several pines, to mt. mahogany 100 yds away. Here the bird gathers a bill-full of insects, back to nest 5:29, feeds, down again. I see no heads out; 5:30, I leave.

TRH #s 380-82, from #1; 383, probably from #1; 384-5, from #8.

3 { June 30 - 7:45 A.M. - at #3 - screams from the mt. mahog. to E; one parent around nest and N. asps, screams. No sound from nest, no young visible.

14 { [At 7:35 - #14, at Twin Spring - a glance showed a young bird's head poking out; very noisy.

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June 30 (cont'd.) - 7:59 A.M. - B to nest, sits at entrance, looks at it and looks around; over to branch, hitches down, taps. silent. 8:06 - adult scream NW of nest. 8:08 - yelps, cheeps of young (not from nest). 8:15 - more yelps; as I walk toward nest, B comes to nest tree, starts screaming. From the S. asp (10 yds S.) a young bird flutters out, across 75 yds to big pines to the NW - same place one went yesterday. Now both A and B up, screaming at me; A has insect food, B perhaps plant food. Both fly to W, after working around the usual perching places - branch by nest, asp 6ft away, small dead asp. 8:22 - now A back to branch by nest, screams at me, taps, preens; goes to nest, looks at entrance, back to branch. 8:25 - B from E, with insects; both scream; squaks; A to E; B still screaming, undoubtedly at me, goes to nest, looks at it, head not in; over to asp, continues screaming. Ants and flies at nest entrance. Juv. flickers in the asps are ignored. Now B over to W, few more screams. 8:37 - About 100 yds W - screams, yelps, cheeps - young being attended close by - I saw adult but couldn't see young. 8:42 - same. 8:50 - More of same noises - now I see B feed a young bird about 8 ft up in a juniper - then B to mt. mahog. close by, works. 8:53 - Yelps from near #6 - maybe young are out there; I had better go and see. As I go, A comes up a few feet away, screams at me without dropping the insects in its bill. 9:00 A.M. - at #6 - 9:01 - young in nest are fed; loud cheeps, heads in and out. 9:04 d. from E, I feed, to f. asp, off. 9:05 - d. to f. asp, then out of sight. 9:08 - d. to f. asp, to nest, I feed, to E. Much mt. mahogany to E.

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June 30 (cont'd.) 9:15 - d>n from E, squaks, ~~to~~ (d. at f. asp), to nest, 1 feed, to E; d. from f. asp, 1 feed, back to f. asp. Young cheeping constantly, heads in almost all the time. 9:20 d. from E, 7 feeds or attempts, to f. asp. 9:22 d. to E. 9:25 d>n from E, 1 feed, to branch, x-wise, to f. asp, to E. 9:27 - bird from E, 1 feed, to E. 9:29 - d>n from E, 1 feed to a branch, x-wise, to f. asp, tops. 9:30.5 d>n to E. Sun now on E. edge of nest; head comes out, the 1/3 out; cheeps and "screams". 9:34 - same as 9:27. D>n, I think, to another asp by f. asp, tops; 9:35 - to nest, 1 feed, to E. 9:38.5 - d>n from E, 1 feed, to E. 9:41 d. from E, 1 feed, to f. asp, to E. D>n with 2 dragon flies to asp by f. asp, to nest, 1 feed, to E. Squaks from E. D>n to f. asp, to NW. 9:47 - d. from E, 1 feed, to branch, to f. asp, to E. 9:48 - same as 9:27. Young still loud cheeps + screams, a head out most of the time. 9:49 - tattoos from near #3. 9:52.5 - d. from E, 1 feed, to E. Heads in now, just cheeps. 9:55 - d>n from E, 2 feeds, to E. 9:56 same as 9:27. 10:00 - more tattoos from by #3. I leave.

10:40 - at #7 - young cheeping loudly. 10:43 d>n - S - I - W. (same "code" as for nest #1 - see notes on that). No heads of young out; these are 22 days old. 10:45 - d. to nest - I - above nest, W. 11:01.5 - d>n - SW - I - S. 11:05 d - S - I - above nest - flycatches - S. thicket. 11:06 - d>n - SW - squak - I - SW. 11:08 - d - same as 11:05, but to branch, not above. 11:10 d - I - S, as d>n - W - I - SW. 11:12 n. - branch above nest, x-wise - 2-3 half-squak, half-screams - 2 - to N at least 100 yds. 11:14 - d - ? - I - above nest - NW. 11:15 - n - N - I, - S thicket. 11:16 - d>n - S, - I - NW. 11:20 - d>n, W, 2, looks around, S. 11:22 n. from thicket to pines 10 yds S. of me, starts screaming. Then to top of nest ~~beg continues~~; then to top of

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June 30 (cont'd) a dead asp 40 yds N; more screams, to W, back, more screams; away 11:25. 11:26 - d, NE, 2, above nest - ?. 11:28 d, same, W, as d>n, sqwks, W, 1, NW. 11:30 - n., N, gives what I can only call sqwk-screams, 1, looks around, sqwk-scr., branch, NW. 11:30.5 d, ?, 1, above nest, taps. 11:34 - n, NW, screaming, to d., sqwks, n. to nest, 1, looks around, NW. 11:37 - n., NW, 2, NW. 11:40 - I leave. For the first time that I can recall, there was a 16 min. gap in the feeding - 10:45 to 11:01 - and n. was away for 32 minutes. It could easily have been n., therefore, that I saw ^{near} at Twin Spring yesterday. Also, n. seemed nervous, and was very noisy.

1:00 P.M. at #12. Between 1:00 and 1:12, the young were fed 3 times, twice by d., and then by d>n. On the 2nd time, d went in the nest and came out with debris, gliding over to a nearby pine to drop it as before. I saw both parents at the nest together, with the usual sqwks. The young were cheeping, and I could see a head out occasionally. These young must be at least 23-24 days old.

1:20 - at #14, at Twin Spring. A d, not d>n, to nest; goes in, out to a pine 15 yds away, probably cleaning nest. 1:22 - d. back to nest, hitching up from below, in; out again with debris, to a different pine in the opposite direction. The young are cheeping, and a head is usually out. These also look at least 23 or 24 days old. This pair, then, is d. x d>n.

1:40 - to #3; I climb and look in; all I can see is a mass of ants on the bottom feeding on excrement. Nevertheless, B comes up and screams from N. asps.

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June 30 (cont'd). 1:50 - at #6; young's head out, cheeps and screams; parent seems to see me, goes away from nest without feeding, screams. Young $\frac{2}{3}$ out once. 1:55 - d., l, f. asp., sqwk. 1:58 - d, same, no sqwk. 2:07 - d>n to f. asp, sqwk., to nest, l feed, flees suddenly as wren flies at it. 2:08 - same, no wren attack. D>n broke away suddenly as the young was lunging, so maybe the wren just happened at a fortunate moment at 2:07. 2:11 - d, w, f. asp, l, E. 2:14 - d>n, E, f. asp, l, E. 2:20 - I hear cries of parents and young to E. of nest - some must be out already. 2:25 - another feeding from f. asp, back to it, while I am up hoping to glimpse young. 2:30 - d>n to f. asp; d. to nest, l, f. asp, sqwks, d. to W, d>n to E, not to nest. 2:43 - d, f. asp with dragon fly; l, f. asp, taps. 2:45 - d, f. asp, l, E. 2:48 d>n to f. asp; d., l feed, to f. asp by d>n, sqwks; both work; now a juvenal bird ~~saps~~ (saps., of course) flies up from S., alights with them, screaming softly. Both adults drive it away viciously. It goes off about 15 yds N. Now d>n back to f. asp, then d. to f. asp; d. to nest, l feed, E; d>n still at f. asp. 2:51 the young saps. again comes to d>n at f. asp, may be begging. D>n again attacks it viciously, screams and squeals; d>n is on top of the young one, their heads and tails pointing oppositely. The young flies 10 yds E. Now, 2:54 - back to d>n, screaming and begging; d>n drives it down, it comes back up, d>n drives it to the asp by f. asp, then 10 yds farther N. Here it sits, screaming. The young one must be from #3. 2:58 - d, E, l, dodges wren, l, E. Now the young one goes to asp between f. asp and nest; d>n from f. asp, drives it to a pine 40 yds N. 3:00 - d, f. asp, d>n to f. asp, sqwks, away. d. to nest

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June 30 (cont'd.) 1 feed, to E. Cries of young again beyond nest—probably adults chasing the young one, not feeding their own as I guessed earlier. 3:03-d at f. asp, tapping. d. flycatches, W. 3:15-d, W, f. asp, l, E. 3:20-d, E, f. asp, l, f. asp, N. 3:22-d, f. asp, l, f. asp, NE. 3:25 d, E, l, f. asp, W. 3:31-d, W, f. asp, l, asp by f. asp, E. 3:35 d, E, f. asp, l, f. asp. 3:37 d>n, E, f. asp; 3:39-d, E, l, f. asp as d>n to pine by nest, sqwks, d>n to nest, l, E; 3:44 d>n, E, f. asp, pine by nest, to nest, 2, E, x-wise on branch. 3:46-d, W, f. asp, l, E. 3:49 d>n, E, chased from nest by wren; d, E, f. asp, d>n, f. asp; d. to nest, away to W, no feeding; d>n to nest 2-3 feeds, to E, 3:50: I leave.

4:00 P.M. I returned to #8 for a look in—it has already been lined with sticks, probably by a House Wren. This is fast work; the nest was emptied only yesterday

4:15—at #11; 4:17 d>n, SE, l, SE. 4:19-d>n same, 1 feeds. 4:20-same, 1 feed. 4:22-d, SE, l, N, 4:23-d>n, same. 4:25 d>n, N, 2, N. 4:28-d, N, l, W. 4:34-d, S, l, to a nearby branch, x-wise, to SE. I leave. The young here cheep loudly all the time and have their beaks but not heads out; probably about 22 days old.

4:40-4:50-I walked over to the W. of #3, where some young were this morning. I did not see or hear young but both A and B came up screaming, and carried and gathered food, so I presume the young were being cared for still.

4:50-A spot check showed that young were still in #6. They are audible for at least 100 yds.

5:07-d. feeding young in #14; heads in, son in nest.

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June 30 (cont'd) 7:40 P.M. at #12 - tapping - cries of young, head out (adult?) drawn back, 7:43. Head out sporadically for next 12 min - I can't tell whether adult or young; I am sure of a young once, and almost sure of an adult other times. 7:50 tapping, then silence. 7:55 last burst of faint cries from young. 8:15 P.M. - too dark at nest to see; I leave.

I forgot to mention that when I looked in nest #3 I could see light from a slit or crack to the right side. Possibly this serves as an air vent, but I don't remember seeing such in the other nests.

The fact that a young bird was vigorously attacked by both parents at #6 is a fairly sure sign that it was not one of theirs even though it was so close to their nest. This shows the futility of trying to be certain of the source of a young bird by its position. It is possible that some young came out of #6 today, but I don't think so. Some are sure to come out tomorrow, judging by their actions today.

Unfortunately there is no way of counting the young other than going in the nest after them before they leave. Since they seem to depart over a period of two days, possibly even three, the only way to count them as they come out would be to watch the nest every moment of the two days, which is impossible for one person. The young can easily fly out of sight as soon as they come out.

July 1 - 4:00 A.M. - at #6 - young cheeping; still too dark right at nest to see. Tattoos heard in the direction of the former nest #3; other birds noisy.

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Crowder Flat, 5200 ft, 38 mi, NNW of Alturas, Modoc Co., Calif.

July 1 (cont'd) 4:08 A.M. - d. from by f. asp to asp by nest, to nest, feeds or looks in; cries of young increase; d. back to near f. asp. Tattoos E of nest #6; yelps from #3 area. 4:11 - parent to nest, feeds, away; scream from adult, one from young, now cheeps again. Yelp E of #6. Heads still in at nest. 4:13 - harsh adult screams, tattoos by nest. 4:15 d, E, l, f. asp, W; 4:17 - d'n (I guess), E, l, pause, E. 4:20 - d, W, f. asp, l, f. asp, W. 4:22 d'n, sqwks, E, f. asp; 2, E, sqwks, f. asp. 4:24, d, W, l, f. asp by d'n, sqwks; both work. 4:25 Young head out now, cheeps, screams. 4:26 d, f. asp, l, E. d'n screams from f. asp. D'n away, sqwks, E. 4:29 d, E, l, ^{f. asp} E; d'n, E, f. asp. 4:33 d'n, E, l, E. Young 1/2-outing. 4:36 head in; d'n, E, l, E. Screams from #11 area. 4:38 head out; 4:41 - d'n, E, l, E, f. asp, E. Screams from E; young 1/2-outing again, cheeps, few screams. 4:44 - d, E, l, f. asp, screams, E, screams. 4:45 - d'n, ^E f. asp, screams, l, f. asp. 4:46 - d, E, l, wren flutters about, W. 4:48 - d'n, E, left of nest, wren flies at ~~him~~ it; young half out, begging; d'n to right, same; d'n to E; yelps; young 2/3 outing; 4:49 - d, W, f. asp l, to ground with wren, E. 4:50 - d'n, E, sqwks, 2, E. Head in and out now. 4:52 - d, E, l, asp 6 ft from nest, taps. 4:54 - d'n, E, l, chased by wren. 4:56 - bird, E, l, E. 4:57 - d, E, l, f. asp, E. Yelps from #3 area. At #6, heads in. 4:59 - d, N, f. asp, ^{preens}; 5:00 A.M. - d, f. asp l, asp by nest, screams, E. Lot of screams + yelps from N, E, and S, yelps from latter (#3 area). Sun just getting in treetops. 5:02 d'n, E, above and around nest, down to it, 2, E. Screams from E. Tattoos and yelps from #3 area. 5:04 - d, E, f. asp, E. 5:06 - d, E, l, asp by nest E. 5:08 - d'n, E, sqwks, l, f. asp; 5:09 - d, W, f. asp, sqwks, l, E. 5:10 - half way

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July 1 (cont'd) between #3 and #6 an n. slightly > d. is present, pursued by A of #3. A above n>d, tattooing; much screaming and squking, some yelps; B on ground nearby, screaming. Now out of sight, more screams. 5:12- young at #6 are fed. 5:15- the n>d to above #6, around it to f. asp, works, to another asp, looks in hole, off to N, 5:17. 5:18 d>n, E, l, E. 5:19- d, f. asp, l, branch by nest, whets bill or picks, back to nest, l, E. Yelps from #11 area, to N. 5:20 d, E, l, to branch, E. Young head out, cheeps + some screams. 5:22 d>n, E, f. asp, 2, young lunges 1/2 out on 2nd, E. 5:24- d, screams, E, l, E. 5:26- d, screams, E, l, screams, f. asp, screams; 5:27- to E. 5:29- tattoo from #3 area. 5:30 I leave; still quite cold; young's head in, cheeping.

6:58- back at #6; sun on nest tree, much warmer; young with head out, cheeps, screams. 7:00 A.M. Parent feeds, to E. 7:03- d>n, E, l, ?. 7:04- d, E, l, f. asp. Then d>n, E, l, E; 7:05 d., f. asp, l, E. 7:08- 3 fast visits and feeds by both d and d>n, to and from E and f. asp. There are at least two young in the nest, as one has distinct signs of white head-stripes while the other is almost plain sooty. 7:13- d>n, E, squk, l, E; d, W, f. asp, l, E. 7:16 d, N, f. asp, gets winged insect, l, N; 7:17 d>n, E, ^{squk} 3, E. 7:19 d, N, f. asp, with winged insect, looks something like dragon fly, ~~to~~ screams; tattoo from N, d screams on wing, to nest, l, f. asp. 7:21- d>n, E, l, f. asp. 7:22- to NW. 7:24- d, N, squk, l, ^{branch} asp by nest, E. 7:27- bird, E, l, E. 7:29- d, E, f. asp, l, E. 7:31- bird, E, l, N. 7:34- d, N, asp 10 yds W of nest, taps upside-down, f. asp. 7:35- d>n, E, l, f. asp. No squks, both there. 7:38 d, f. asp, l, f. asp, l, N. 7:41- d, E, l, f. asp, E; now d>n, same, still at f. asp. 7:43- E. 7:43.5 d>n, E, 2, N. 7:44- d, E, l, E. 7:46- d, E, l, f. asp.

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July 1 (cont'd.) 7:50 - bird, E, 1, N. 7:51 same. 7:53 - d, E, f. asp, 1, E. - squks.
7:54 - d>n, E, 3, N - screams. 7:55 - d, asp by f. asp, 1, big, long legged, winged
insect, E. 7:59 - d, N, same - young can't hold the insect - crane fly? -
d. to f. asp. 8:02 d, E, 2 more crane flies? - young takes, then re-
jects them; d, f. asp; to nest, 3, N. 8:05 - d, N, 1, f. asp. 8:08 -
same as 7:50. 8:10 - same; a young "d." is $\frac{1}{2}$ -outing; before,
it was a "d>n" - with white post-ocular stripe. 8:12 - d, E, 1, f. asp.
8:17 - bird, SE, 1, SE - very fast. 8:18 d>n, E, squks, f. asp; d, E,
1, SE; d>n, ~~and~~ f. asp, 1, S. 8:22 - d, E, 1, SE. Sun on edge
of nest now. 8:24 d, E, 1, SE; then d>n, same; both with large
mass of insects. 8:26 - d, same. 8:28 - now young d. pulls back,
d>n young's head out. 8:28 - d, f. asp, 1, E. 8:29, bird,
E, 1, E. 8:31 - same. 8:32 - same - takes barely a second. 8:34 - d,
E, 1, f. asp, pine, nest, 1, pine again. 8:36 d, S, 1, S. 8:37 - same.
8:39 - d, E, 1, S. 8:39.5 - d>n, 1, S. 8:42 - d, E, 1, f. asp. Young d>n
now withdrawn, young d. at entrance; 8:43 d, f. asp, 1, SE. 8:44
d>n, 1, f. asp; now d, E, 1, f. asp by d>n squks; both, E.
8:48 - d, E, 1, E. Young are withdrawn. D>n, same, 8:50. 8:52
young d>n's head out, cheeps, screams. 8:55 d>n, E, 1, S. 8:57 - d
at f. asp, squk, 1, E. 8:58 d>n, E, 2, S. 8:59 - d, E, 1, f. asp, S.
9:01 d, E, 1, ^E, squk; d>n at f. asp, to nest, 1, S. I leave.
9:16 - back at #6 - I decide to wait until 10:00. 9:17 bird from
f. asp, 1, E. Young withdrawn. 9:19 d>n, E, 1, f. asp. away. 9:20 - d.
to f. asp, 1, f. asp, W. 9:25 - d. from W to 10yds E, to nest, 1,
E. 9:25.5 d>n, E, 1, S. Young d>n's head out. 9:29 - d, NW, ~~hook~~
harsh screams, S. Sun now in nest. 9:31 d>n to f. asp, squks,
to nest, 1, SE. 9:34 - d, same as 9:25. 9:35 - d>n, E, 1, f. asp, off.
9:36 - d, E, 1, E. 9:38 - d>n, E, 1; d to nest, squks, both to
pine by nest, then both to N of nest, squks. Then
yelps and squks from E. 9:41 - bird, 1, off to N.

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July 1 (cont'd.) - 2 yelps from N. 9:44 d, E, l, f. asp, W. 9:45-d>n, E, l, E. Now young d. has head out, cheeps and screams. After several $\frac{2}{3}$ outs, young d. comes out, 9:50, flutters to ground 2 ft S. of nest. D>n up, screaming and yelping and squking, "leads" young d. up asp at whose base it is to 1 ft above ground, goes to f. asp, taps vigorously, gathers food, to nest, feeds another young d. with its head out; does not feed the out young d, who remains silent, picks at asp. 9:56 -d>n, f. asp, squks; young d. now to big pine 5 ft S. of nest, starts hitching up; d, E, l, over with d>n to big pine, above young d. Young one screams, climbs, parents above, yelping, screaming. In a minute or so young d. is 30 ft up. One parent flies W., yelping. 10:00 - A young d. in nest has head out, cheeping. 10:02 d, W, f. asp, squks; has ?crane fly. 10:03, to nest, l, f. asp. Young d. out, screams; d. to E, past him, squks. 10:06 - both adults near; yelps, screams; screams from young d. D, E, l, f. asp; d>n, E, l, E; d, S. Young d. not in sight, but apparently not being attended. 10:08 - parent, E, l, to level of young d, but in different tree, then to E. Young d. still screams a little. 10:11 - d, W, l, to branch, E. All silent except cheeps in nest. 10:12 - d>n, E, squk, l, f. asp, S, then W. 10:14 - d, E, l, E. 10:14.5 - d, E, l, W. 10:17 - d>n, E, l, f. asp.^{off.} 10:18 - d, W, f. asp, l, f. asp, S. Young d. screams, no apparent response. 10:21 d, l, W. - Young d, more screams. Now I work around to the E in an attempt to see young d., but both d. and d>n come up and start screaming, and then all the passerines in the area come up scolding, so I leave. Once again, the parents seem to lead the young one up high.

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July 1 (cont'd.) - 10:45 - at #14; d. to nest, feeds once, below it, picks, up to nest, in, cleans it; 10:49 d'n to nest, 1 feed, to mt. mahogonies in E. 10:52 d. to nest, in, cleans it, in a long glide as before and as #12 does. 10:54 - d. to below nest, hitches up and around it; now d'n to nest, squks, d. off, d'n feeds once, then away. The young are cheeping loudly but no heads are out. 10:57 - d'n to nest, 1 feed, away. 11:00 - d. to nest feeds, pauses, off to W, yelps. screams from young in nest. 11:08 - d. to nest, in; * 11:11.5 - d'n to nest, squks, d. away, d'n feeds 2-3 times, away. one feeding between 11:00 and 11:08, while I was chasing after the yelps, of which I heard several just before 10:45. The screams of the young would put their age at about 24 days, but it seems unusual for a parent to go in the nest so often, as d. does, at that stage.

11:28 - at #12 - silent, no heads out. 11:33 - I notice d. up by nest, preening. D. flies around a little, back to nest tree, about $\frac{7}{8}$ way up, preens, taps. 11:37 - d'n up from asps to pine 25-30 yds from nest tree; has food (insects) in beak; goes to a young bird, feeds; faint cheeps; d'n sees me, screams; d. from nest tree, also screams; one goes across meadow; 11:47 more sounds of young being fed - I see d'n feeding a young 3 ft up in an asp 50 yds from nest; d. about 15 yds away. The mottled black-and-white young is beautifully camouflaged against the black-and-white aspen trunk. 11:52 - now an adult again feeds the young one in the pine; it cheeps, adult quiet. It is about 40 ft up. 11:57 - another feeding of young - d. participates; adults quiet, young cheep softly.

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July 1 (cont'd.) - 12:05 - another feeding of young one in pine, by dsn. There are at least 3 young close by, 2 in the aspens and one in the pine. Both parents are feeding them very quietly, except when they see me and start screaming.

12:38 - at #10 - cheeps of young audible, no heads out.

12:39 - bird out, to mt. mahogany thicket below nest tree. 12:43 - bird from ^W, to right of nest, in, out, cleans nest. 12:55 - bird to nest from W, to left of it, in, out, down to same mt. mahogany clump. I leave. This nest does not seem to be very far along - probably about 16 days.

2:02 - #7 - d, S, 1, above nest, W. 2:06 n, N, thicket, 1, N.

2:07 - d, ?, S, above nest, N. 2:10 - young head part out; 2:11 - n, N, 1, 5 yds NW, screams. Sun in nest now; n. below nest, taps.

2:13 - n. to NW. Now d. to nest, 1, above nest, NW. 2:17 - n, NW, branch, 1, branch, ~~preens~~, NW. 2:18 - d, N, 1, above nest, NW. High-pitched screams from nest. D. to thicket, 2 yelps. 2:20

d., 1, above nest, N. 2:22 - dsn to asp 6 ft off, to nest, 1, looks to nearby asp, taps; n. from W, 5 or 6, NE, Dsn off.

2:26 - d, thicket, n, NE; ~~squaks~~; d to ~~NE~~ above nest, to NE; n, 2-3, NE. 2:29 - d, thicket, 1, above nest, N. 2:33

n, NE, branch, 1, branch, thicket. yelps from thicket. 2:34

another feeding. 2:35 d, thicket, asp 6 ft off, screams, ^{squaks}, 1, above nest, asp 6 ft off screams, SE, 1-200 yds. 2:38 - d, E, asp 6 ft

off, 1, above nest, asp 6 ft off; now dsn, W, ~~squaks~~; 1, looks around, W; d, 1, flycatches, to below nest, off. 2:40 - n, NE, branch, thicket; yelps. 2:41 - d, 1, above nest, thicket;

to pine 10 yds SW; to nest, 1, branch, same pine; 2:44 - d, to nest, 1, above nest, thicket. 2:45 - I leave. As I

go dsn comes up for more feeding. Then, about 100 yds.

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July 1 (cont'd.) N, d>n sees me and comes up screaming. When I was approaching from the N, about 2:00, I was met 200yds from the nest by d>n, or at least a d>n, which screamed and screamed and followed me a short distance as I struck out through the woods to avoid this sentinel.

3:25 - at #6 - Young bird with head out, cheeping and screaming.

3:30 - d>n, E, f. asp, tree by f. asp, E. Young suddenly silent, now noisy again. 3:32 - d, N, f. asp, with ? crane flies; pounds them; to nest, 1 feed, young takes them; ~~d>n~~, f. asp, several screams; taps. Head in now. 3:34 - ~~d>n~~ to E. 3:35 d>n, E,

squaks, f. asp, squaks, nest, 1, pine, f. asp. Head out. 3:41 d, E, f. asp, 1, f. asp, W, asp by f. asp, f. asp, 1, f. asp, W.

6 3:50 - young d>n's head out; d. to N, f. asp with ? crane fly; 1, f. asp, E. 1 or 2 screams from an "out" young nearby

Young d>n $\frac{2}{3}$ outing; 3:54 - d>n, f. asp, squwk, 1, f. asp,

screams. Young d>n $\frac{2}{3}$ outing; 3:58 - d>n, W, f. asp, 1, E, f. asp, screams. 4:00 P.M. d, E, 1, E. 4:01 - young d's head out

now. 4:03 d, E, 1, pause, E; d>n, scream, f. asp, E. 4:05, d,

E, f. asp, 1, f. asp, screams, E. 4:08 - d>n, E, f. asp, pine, nest, 2, pine. 4:11 - d, E, 1, pause, N. 4:12 d>n, E, f. asp, screams,

3, pine, f. asp. 4:14 - d, N, f. asp by d>n, squaks, d. to nest, 1, with "shoulder hunching", SE. 4:16 - young d>n with head

out now; d, E, 1, E. 4:21 - d, E, 1, f. asp, squaks, d>n to

E, d. at f. asp. Young d's head out now. 4:25 d>n to tree by f. asp, squwk, d over to it, d>n to W, d. to W.

4:27 d, f. asp, W. 4:28 - d, E, W; 4:29 d, E, 1, f. asp;

4:30, d, f. asp, 1, N.

4:35 - at #11; medium loud cheeps, intervals of silence.

4:37 - d>n, NE, 1, NE; head out now, then back in.

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Crowder Flat, 5200 ft., 38 mi. NNW of Alturas, Modoc Co., Calif.

July 1 (cont'd). 4:45 P.M. head out, looks around; silent; back in; out again. 4:47 - d, NE, 1, off. Cheeping starts, head out. now silent. D. in pine 50 yds SW, screams, sqwks. 4:50 - head in, cheeping starts again. 4:53 d>n, NE, 1, head out, d>n to W. scream from d., still where last noted. 4:56 - d>n (I think) from SW, 1, NE. Few screams from young in nest. 4:59 d>n from at least 100 yds E, 1, to same pine 50 yds SW, screams at me - I am just below it. 5:00 - head in, cheeping; I leave.

5:05 - A spot check at #6 shows a young d>n with its head out, cheeping; one parent near, screams at me.

5:15 - At #14 - young still in nest, cheeping. 5:18 - head out, screams; d. to nest feeds, then to one side; young begs, screams; d. off to W., yelping. Sun is right in the nest. These young are certainly 24 days old, maybe 25.

7:30 P.M. - at #6 - young's head out, cheeps. 7:37 - d>n at f. asp. screams, sqwks; to nest, 1, E, back to f. asp. Now a herd of horses comes along right in the way, and it is 7:50 before I get them away. D. is in f. asp, young a few screams, then only cheeps. At 8:04 it is just barely light enough by the nest to see, and a bird comes up and goes in. D. is no longer at f. asp. 8:07 - brief tapping. 8:10 - young now silent. 8:12 I leave, as it is quite dark at nest.

July 2 - 3:58 A.M. - still dark at nest #6. 4:02 - tut-tut from about 50 yds, N. Light enough to see #6; brief cries of young, 4:03. 4:05 - parent at nest, facing it, louder cries; parent to W, silent. 4:09 - tut-tut E of #6; cries continue; no heads out as yet.

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July 2 (cont'd). 4:10 d, d>n at f. asp, sqwks. 4:11 - d. to nest, 1 feed, away. 4:12 d>n, 1, E. Loud cries, screams from young in nest; tattoos to S. D>n at f. asp. 4:14 - clouds in E. now orange; d>n away from f. asp, to E. 4:16 parent from f. asp, 1, NE. 4:16.5 - same. 4:19 - d>n, E, ^{sawks.} f. asp, 1, f. asp; 4:21 d>n, f. asp, 1, NE. 4:23 - d, E, 2, E; d>n, E, f. asp, 2, E. 4:26 - d, E, 1, E. 4:27 - d>n, E, sqwks, f. asp, 3, f. asp; away. 4:29 - d, E, 1, E. 4:31 - d>n, E, pine by nest, sqwk, 1, pine, f. asp. 4:32 - d, E, 1, f. asp, sqwks; both away. 4:34 - d, E, 1, E; head of young comes out, for the 1st time this morning. 4:41 - d, E, 1, E. 4:44 - same, possibly d>n. Tattoos from N, near #3. 4:46 - same. 4:49 - d, same. 4:50 - d>n, W, sqwks, f. asp; big pine, 1, pine, f. asp. 4:51.5; d, E, 2, N. 4:52 - d>n, f. asp, 1, to another pine, E. 4:55 - d, N, 1, E; this is a young d>n with its head out. 4:56 - d>n, E, 1, E. Sun in treetops. 4:58 - d>n, E, 1, pine, f. asp., away. Heads withdrawn. 5:02 - bird, E, 1, E. 5:04 - same. 5:05 - d>n, E, 1, pine, f. asp, 1, E; then d>n back, 1, pine, E. Young d's head out. 5:10 - d>n, E, 1, pine. 5:15 d>n, E, 1, pine, f. asp. 5:16 - d>n to SW, screams; d, E, 1, E. I leave. 7:13 back at #6; head out, cheeping; now withdrawn. Yelps from #3 area. 7:18 - d>n, E, sqwks, f. asp, 1, pine, f. asp. Few screams from young. 7:20 young d's head out. 7:24 - d, E, 1, E. Head withdrawn. Sun on right side of nest tree as one faces nest. 7:28 - d, E, with ? crane fly, 1, f. asp, sqwks. 7:29 - ~~young~~ d. half-outing, screams and cheeps. 7:31 - d, E, 1, E. 7:34 - d. or d>n, same. 7:36 - d, E, 1, f. asp, 1, E. Adult screams from E. 7:40 bird to f. asp, sqwks, 1, sqwks, f. asp. Young d>n has head out now. 7:45 - after many 1/2 outs, the young d>n pops out, flutters to base of asp right by nest tree just as young d. did yesterday.

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Crowder Flat, 5200 ft, 38mi. NNW of Alturas, Modoc Co., Calif.

July 2 (cont'd). Another young d>n puts head out; much cheeping and young screams; young d>n hitches up 1 ft., taps, sits quietly. 7:49- d>n from E to nest, loud scream-sqwk, feed at nest, another scr-sqwk, to f. asp. 7:53 d>n from W, scr-sqwk, feeds at nest, to E. Steller Jays a few feet away are ignored; so is the young d>n, as far as I can see. 1:56 d, E, l, to branch by nest, to f. asp, sqwks.^{tops} Young d>n up 1 more foot. 7:57- d>n, E, sqwks, l, to f. asp by d, sqwks; d. to E, d>n to pine, sqwks, to E, sqwks. Jays seem to disturb them now. 7:59- d>n, E, sqwk, to young d>n, to nest, l, E. Young d>n taps, now climbs up to level of nest. 8:01, d, E, by nest with ?crane flies, looks at young d>n, to nest, l, sqwks, f. asp. 8:04- d to E. Young d>n preens, taps, scratches ears. 8:08- d, E, f. asp, sqwks; l, pine 6 ft away, looks at young d>n; d>n (ad.) from E, d. to f. asp. D>n, l, to same pine, to E.; d also away. 8:16- young d's head out. 8:17 d, to pine 10 yds S. of nest, sqwks, to nest with ?crane flies, feeds; juv. d>n agitated, screams; d. to f. asp, sqwks; d>n to same pine as d, sqwks; d. again to nest, feeds, more cries from juv. d>n; d. to E, d>n to E. Juv. d>n now flies to nest tree, hitches up to 10 ft., taps, screams. Parents have given it no attention. 8:22- d, E, sqwks, l, f. asp. Juv. d>n hitches a little higher, screams. 8:26- d, E, l, sqwks, f. asp; then E. Juv. d>n now at least 20 ft up, not in sight, but I hear its screams. It must be in the big pine 6 ft S. of nest. No "leading" by parents with this young. 8:30- d, E, l, f. asp. Juv. d>n flies over to dead asp between nest and f. asp, screams; d. to branch at his level, screams and

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July 2 (cont'd.) sqwks, not to juv., to E. 8:32-d. back to f. asp. screams; juv. screams; adult screams from E. 8:37-d, big pine, l, big pine, f. asp., SW. Yelps 8:39-d, E, l, f. asp, E. Young d>n has head out of nest, screams; so does the one already out 8:42-bird from E, l, E 8:46 D>n, E, sqwks, f. asp; d, E, l, f. asp, d>n, l, E; d, E. Sqwks. Now juv. d>n flies to a pine about 5 yds E. 8:52-d>n, E, f. asp, sqwks, l, f. asp, W. The juv. d>n in nest is $\frac{1}{2}$ -outing. 8:59-d, E, l, f. asp, W. Now young d. $\frac{1}{2}$ -outing; 9:11 d, W, sqwks, f. asp, l, f. asp, sqwks + yelps, E. 9:16-d>n, E, f. asp, l, f. asp., away. Sqwks while at f. asp. 9:23-d, E, f. asp, sqwks, l, E. 9:37-d, E, f. asp, l, E, screams; ^{d>n} to f. asp, sqwks, l, pine, f. asp, sqwks, 9:40, to nest, l, f. asp; 9:41 d, E, l, f. asp, sqwks, d>n, E. 9:43 d. asp by f. asp. X-wise, E, sqwks. 9:49-d, E, f. asp, flycatches to close pine, to nest, l, to NW. 9:50-d>n, f. asp, SW. 9:55- I left. I could hear young cheeping at #11.

At 10:30 I arrived at #7 with Dom Salemi from the Willow Creek Ranch. I collected n, d, and d>n in that order as they came to the nest. Then we nailed cloth over the entrance and cut the tree down and sawed out the section with the nest. I chloroformed the young and opened the nest through the top. There were 5 young in it, obviously not ready to leave, but well feathered. Eggs had hatched in this nest 24 days ago; perhaps the growth of the young was retarded, or perhaps these hatched a few days later. At any rate, on June 8 this nest had 6 eggs and 2 newly hatched young; It is perhaps significant that 5 young, the same number as the usual clutch, is all that hatched or survived.



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Crowder Flat, 5200ft, 38mi NNW of Alturas, Modoc Co., Calif.

July 2 (cont'd) 1:45 - at #6 - a young d. still in nest, cheeping and screaming. D. spots me from tree (asp) by f. asp, and screams for several minutes, finally flying E. At f. asp are 2 young, d, d>n, sitting quietly. They must be from #6 considering how a "foreign" juvenal was repeatedly chased yesterday. Both young are feeding, 1:58. 2:10 - ♀ juvenal d>n flies off 30 yds to SE. Now d. to f. asp, 2:11; silent; feeds by juv. d, feeds it once, soft squaks or cheeps; d. to E, past nest, where a young d. is still 1/2 outing. 2:22 - d, w, asp by f. asp, f. asp below juv. d, feed it once, with faint cheep, no begging from juv.; then d. away, screams; not to nest. Juv. d. still feeding on its own. 2:28 d>n from NE, asp by f. asp, gathers insects. Faint squks from juv. d; d>n to juv. d. on f. asp, feeds it; juv. d. right back to own feeding, d>n to E. The cheeping nest young are (is?) ignored. 2:30 - I leave. I now walked over and searched W. of #3 - no sign of saps. Then I went to nest #3, squeaked, no response of any kind. Finally, I went to the mt. mahogany to the E where I had so often seen them. Here one flushed silently and flew across the meadow to the W, flying so strongly I think it must have been an adult. This behavior contrasts strongly with the past few days.

On my way back to Twin Spring I again saw a perfect ♂ nuchalis, which cannot be n. of #7 as that one was collected this morning. It flew off, and my searching about for it and/or its nest yielded no results.

Now at #14, 3:00 P.M. No sound of young,



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Crowder Flat, 5200ft, 38mi. NNW of Alturas, Modoc Co., Calif.

July 2 (cont'd), no heads out. No adults seen or heard.

At 5:30 A.M. this morning the young were cheeping and screaming, and a head was out. — same at 6:45 A.M.

11 6:35 P.M. — at #11; no sound or sight of adults or young.
6 Now to #6; one young at least still in nest, cheeping and screaming with its head out. 6:45 — at #14 — no sound or sight of young; an adult comes up to nest tree, hitches up near nest, then away; I think this was dzn.

11 July 3 6:55 A.M. — at #11 — no sight or sound of young, but dzn was close by, silent. At #6 — a few cheeps and a finger poked in the nest showed that one more young, at least, is still in. D. came up to f. asp, screamed. I moved on to the #3 area, and a few squeaks brought screams from B about 50 yds away. B's agitation increased as I poked around the nest, and, sure of the identification, I collected it. Now A screamed from the mt. mahogany to the E and then came up and screamed at me and was collected also. I heard cries of young E. of #6. Another search around #11 disclosed nothing. Also, there were no young in A's mt. mahogany clump.

14 8:05 — at #14 — yelps from W; nest silent, no head visible. No adults seen around.

2 8:30 — to nest #2, collected the parents as they came up, chopped open the nest, and took the young which will be put in formalin. I would guess they are about 10 days old, and they were very noisy and active. This was the 2nd nesting attempt of pr. #2.

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July 3 (cont'd.) - 10:20 - juv. dsn at f. asp at #6; flies to a pine close by at my approach. I go to photograph site #8.

10:45 - back at #6; a young d. still in nest, cheeping occasionally; dsn around nest area, screaming; a juv. d. at feeding asp, sitting quietly.

At 10:30, at nest #8, a d slightly sn began screaming from asps 15 yds away. Both parents at #8 are already collected; this could be d. from #1, 350 yds N.

10:52 - #6, d, E, I, f. asp, sqwk, no sound or motion from juv. d. there, d. to E without feeding or picking up anything.

11:05 - yelps from E. 11:07 - juv. d. in nest screams; now screams at young and yelps of parents to W. I think juv. d. at f. asp also gives a few screams. 11:12 - juv. dsn from E to

big pine by nest, hitches up. D. from N, soft sqwk, feeds it, hitches up a few feet, juv. dsn follows. Now d. off to N. Now a sqws. to over my head, screams. 11:15 -

screams + yelps from SW. Dsn to E from W, to nest, I, to big pine, screams, to f. asp, does not attend the juv. d.

there, to E. 11:19 - d. to asp 10 yds SW of nest, screams, to nest, I, to a pine, screams, to S, screams, tattoos

once. 11:28 juv. d. at f. asp, preens, stretches each wing, flies to pine 10 yds E of f. asp, hitches up above 20 ft.

11:29 - from W, sounds of juv. being attended. 11:43 - dsn,

E, I, asp 10 yds W. 11:45 - d. to E; sound of young attended;

juv. dsn from E to Pygmy Nuthatch nest 10 yds W. of #6; Nuthatches very disturbed, chase juv dsn off to E. I leave.

Just as I go, 12:49, d. to nest, I, f. asp, picks, to SW.

Between #6 and #8, I scared a juv. dsn from a clump of asps. It flew to a big pine, alighted rather shakily, and started to hitch up. An adult, which

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July 3 (cont'd.) may have been d. from either #6 or #8, came up to above the juv., ~~fed~~ fed it, and seemed to lead it higher up the trunk. When the juv. got about 40 ft up, it flew over toward #6.

At 4:45 I returned to #6. All was silent, and a look with the mirror showed the nest empty. Then the parents came up screaming, ^(separately) and I collected both. I can account for at least 4 young out of this nest, 2 d>n and 2 d., and I don't doubt that there was a 5th.

I forgot to mention that when I collected the d>n at #2, it had in its beak several red ants and a couple of small winged insects.

July 4 - Departed before dawn for Berkeley.



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Sphyrapicus varius nuchalis

Dry Lake, 15 mi. N. of Princeton, British Columbia

April 28 - 5:40 A.M. Overcast. Sapsuckers were heard tattooing from all around the lake, and occasional yelps were heard, apparently when two birds come together. I once saw three together, and there was a chase. I guess there are about four pairs, perhaps more, right around the lake. All that I have seen are typical nuchalis. The tattoos and calls do not sound the least bit different from those of the daggetti that I heard so often last summer.

At about 6:30 A.M. the tattoos just about ceased; only very occasionally was one heard.

The tattooing birds (males?) are showing interest in nest sites, as they pause and look in when there happens to be a hole in the tree near where their noise-making is going on.

At 7:45 A.M., at Round Lake (south end), about $\frac{1}{2}$ mi. N. of Dry Lake, I came across 2 sapsuckers (nuchalis) about 30 yds apart, each in the top of a dead fir tree. One tattooed more often than the other, but when the 2nd one tattooed the first almost always answered. This went on until just after 8:00 A.M., when the 2nd bird

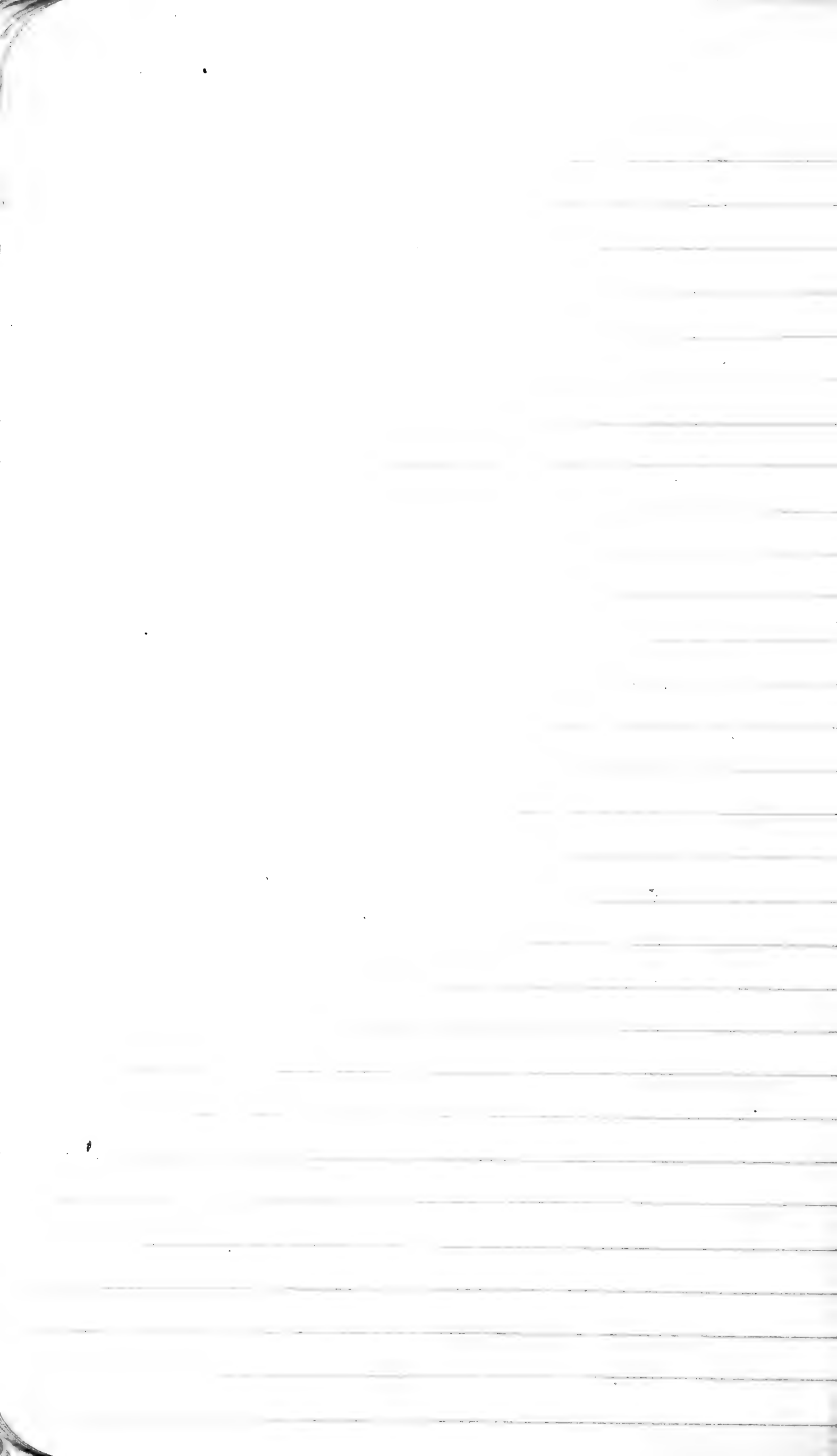
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Dry Lake, 15 mi. N. of Princeton, British Columbia

April 28 (cont'd). flew off; the first paused, tattooed once, and flew off also. A few minutes later I found two more birds not far away - possibly the same two - in just such a talking contest. I got close enough to see that one, at least, raised its crown feathers as it tattooed.

At 9:15, at the north end of Dry Lake, I heard tattooing; suddenly four nuchalis appeared within a few feet of each other, "crests" raised, and squawking loudly. There was some tattooing, and much bobbing up and down (= towards and away from the branch). Two birds would approach each other on opposite sides of a branch, "crests" up, and squawking. Then one would fly to another branch, and the other 3 would soon follow. No actual contact was seen. It did not seem to be an attempt to drive one another away. One bird was lost to sight, and 3 remained. One of these was in perfect plumage, all marks distinct, and the other two seemed to be first-year birds, with many light-tipped feathers in the pectoral area. These two latter



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April 28 (cont'd) tattooed back-and-forth on branches of the same tree, the other bird sat by silently. I could not be sure of the sexes of any. Then one of the younger birds flew off, and the other remained, tattooing. At 9:55 A.M., it is still there, tattooing, although light rain and hail has come up. I do not see ~~see~~ or hear any of the others.

10:00 A.M. - I see the "old" bird now - it is about 8 ft above the tattooing one, on the same branch. The lower one tattoos about every 45 sec.; in the middle of the tattoo, the other bird gives a brief "roll" of ~~its~~ its own - quite noticeable, always while the other is tattooing.

Between 10:04 and 10:13, one tattooed 20 times. The other bird mostly preened, only once or twice giving a roll, and once while the other was not tattooing. On about the 18th time, there were a couple of tattoos from near by. Between tattoos, the performer just sits. At 10:37 another bird flew up nearby. One of the two flew over towards it, and suddenly there were all four, squawking and chasing. This lasted only a few seconds, and then all was quiet except for some light tattooing.

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Dry Lake, 15 mi. N. of Princeton, British Columbia

April 28, (cont'd.) At 10:50 there was another uproar of squawks involving at least 3 birds. The "old" one seemed to be chasing ~~the~~^a younger bird, perhaps a ♀? Then all moved south about 100 yds, where more tattooing and sporadic squawks and yelps are heard. Perhaps these are all males. Quite marked bobbing up and down was noted in both birds mentioned above, when perched lengthwise or crosswise.

11:00 A.M. Two are now about 50 yds apart, one in a big pine, one in a dead aspen. The "pine" bird tattoos louder and oftener. 11:17 - a well-marked bird flies up to a dead asp about 10 yds from the other sapsucker there. The latter is rather blurry about the head stripes - probably a bird of the year, but perhaps an intermediate. 11:20 - yelps - now all three together, behaving just as described before. There are 2 "adults", one "imm." (the latter shows some whitish on throat - probably a ♀). One ad. chases the ♀? a short way; stops, ~~see~~ it and other ad. squawk at each other close together - one goes to a dead stub, tattoos; ♀? off to some yds north; one ad. follows then other; much squawking, yelping, tattoo.

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Dry Lake, 15 mi. N. of Princeton, British Columbia,

April 28 (cont'd) - both "ads" again engage each other in noise making. An exchange of tattoos - one approaches the other, then flies over to pine-squawks - all four birds there, much "crest"-raising, bobbing, squawking - can't tell which is after which.

At 11:40 there are only two birds visible - one an "ad.," tattooing on a dead stub and a ♀? in a dead asp about 10 ft. away. After a while the ♀? flies down and out of sight. screams and yelps are heard from time to time. The "ad." is still sitting at the top of the dead stub, tattooing occasionally. I leave, 12:00.

The trees around here are not much worked by sapsuckers; perhaps those here are recently arrived. I think they are just ~~in~~ establishing territories and choosing mates, with nest construction not yet begun.

I have not yet seen any ruber; there is a high ridge running north-south just to the west of here, and that may act as a barrier. Some streams run through it, so a few should drift through.

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S.v. nuchalis

Dry Lake 15mi. N. of Princeton, British Columbia

April 29 - 4:50 A.M. - Heard tattooing across the lake - sun not yet into this valley - heavy frost on ground - clear, cold. 5:00 A.M. - tattooing near cabin. 5:15-7:00 A.M. - Walked south almost to Burns Lake, the one next to Dry Lake. Here I heard and saw at least 3 pairs of sapsuckers, all nuchalis. They were not very active; the sun had not yet reached this area, and it was very cold. 7:15 A.M. - Back at cabin; I heard tattooing right by the cabin, and 3 birds appeared, - yelping, squawking, crests raised, bobbing, hitching around and chasing each other. The pattern seems to be this: one bird starts tattooing, and is answered by one or two others nearby. This goes on for several minutes. Then one flies over to ~~the~~ another, and a third may join them. There is a great deal of yelping and squawking, perhaps some tattooing, and bobbing up and down with crests raised. They hitch around branches or the trunk towards each other. Any one may be the apparent aggressor during this. If one leaves to another tree, the other two usually follow. This goes on for a minute or so, and then they separate, find a good resonant limb, and begin tattooing again. I have not yet been able to distinguish a ♀ for sure. No copulation attempts have been seen.

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Dry Lake, 15 mi. N. of Princeton, British Columbia

April 29 (cont'd.). About 16 mi. N. of Dry Lake, on the road to Merritt, I noted a nuchalis in a clump of aspens by the road. ~~It~~ In this clump was a dead aspen stub with a partial excavation, and some ~~dead~~ chips lying underneath it. The hole is about 12 ft up. On the way back to Dry Lake, I stopped at this same place - it is 18 mi. N., rather than 16. A sapsucker tattooed, another flew up, there were squawks and bobbing, and one flew away. I did not get a good look at both, but the one that remained was nuchalis. It flew to the small, upper branches of an aspen and fed there. I suppose a little sap was running, as buds were showing. At no time did either bird go to the excavation previously mentioned. This observation covered about $\frac{1}{2}$ hr.

Back at Dry Lake at about 2:00 P.M. - all very quiet, no tattoos. At the north end of the lake, about 3:30, I heard yelps, and saw one sapsucker working at feeding on a cottonwood. A similar observation was made at the south end of the lake.

All was fairly quiet, except for Robins, after the sun went out of the valley. I did not hear a single tattoo or squawk.

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S. v. nuchalis

Tulameen, 17 mi. W. of Princeton, B.C.

April 30 - Arrived here 8:10 A.M. - clear, sunny. Heavy frost last night. In a large aspen grove are 3 typical nuchalis - at least one is definitely a ♀, as I can see white on the throat. This ♀ is definitely tattooing. The other two have all-red throats, and must surely be ♂s; they too are tattooing. I saw the ♀ tattoo several times, then fly over to a ♂ which yelped. Then there were squawks, bobbing, yelps; a male flew at the ♀, and she flew off; the other male came up and chased the ♂, more squawks. Then I saw the ♀ tattoo a few times; a ♂ flew up to her and began bobbing and squawking, crest raised. She immediately did the exact same thing. The other male flew up; the ♀ left, the ♂s squawked at each other, then one went over to the ♀, the other followed, more squawks. Then a quiet period for a minute or so, and tattooing ~~start~~ and yelping start again. The ♂s must be tattooing also, as I have heard 2 of the three doing it at once. Most of this courting goes on about 20-40 ft up in the aspens, with frequent x-wise perching, over a radius of about 20 yds; they may go out over 100 yds, though.

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Tulameen, 17mi. W. of Princeton, B.C.

April 30 (cont'd.) - Now they are arranged in a triangle about 15 yds to a side, the same height - about 40 ft up in aspens; one ♂ tattoos, ♀ tattoos; same ♂ tattoos (loudest), other ♂ tattoos; then ♀. Loud ♂ tattoos, other answers. Other ♂ flies over closer to ♀, to a more resonant branch, tattoos loudly. ♀ tattoos. Both ♂s tattoo back and forth. ♀ flies over to an asp about 50 yds away; 1st ♂ follows; squawks. Now both back to original point - ♂, ♀, on opposite sides of small branch, bobbing, squawking, crown feathers up. [For brevity, I shall refer to this behavior pattern just as "bobbing"]. Then ♀ flies off a few yards with a "rattling squawk," sort of like a Kingfisher call, but nasal and whining. ♂ does likewise. Tree Swallows chattering around caused slight concern, but not noisy Steller Jays.

About a mile north on Tulameen (=otter) Lake, I got a good look at my first ruber in a clump of what I have been calling aspen but which the residents say is white Poplar. From now on, it's poplar. It was a single bird, rather quiet.

At 11:00, about a mile west of Tulameen,

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Tulameen, 17 mi. W. of Princeton, B.C.

April 30 (cont'd.) right along the Tulameen River, I found a typical nuchalis doing some excavating in a poplar about 12 in. in diameter and about 8-10 ft up. It seemed to be at a fresh digging on the north side of the tree, but when it saw me it shifted around to the south. I could see it getting its head part in and then coming out, casting chips from its bill. It saw me, and flew a few yards away silently. I waited 20 minutes, and the bird did not return. I left for fear of causing it to abandon the site.

I went back through Princeton and down the Hope road for 29 miles to the Falls Auto Court. By this time it was 3:30 and no sapsuckers were calling; this looks like a favorable spot, though.

29 mi. S. of Princeton, B.C.

May 1 - No sapsuckers heard from 5:20 to 6:00 A.M. The sun was just coming over the mountains at 5:30, but it is an overcast day. At 6:00 I heard tattoos, yelps, and squawks from some poplars, and saw two sapsuckers - they were against the light, and I couldn't tell which race. A few minutes later I located one tapping (not tattooing) in a small fir; it was typical nuchalis. More tattooing was heard, of the exact same rhythm,

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29 mi. S. of Princeton, B.C.

May 1 (cont'd.) but perceptibly slower. This turned out to be ^a Williamson Sapsucker, S. thyroideus. Several were heard. Their calls seem to come at slower intervals, too. Farther down the road towards Hope, about 33 mi. S., I again heard tattoos and yelps and saw a sapsucker in the top of a big dead tree over 100 yds away. With 10x binocular I could see that it was nuchalis or close to it. The black pectoral band was visible, but the bird was at such an angle that I couldn't see the head striping well. Then it flew off out of sight. (Cowan later collected thyroideus here)

I returned to Dry Lake in the afternoon, where it rained steadily.

May 2 (Dry Lake) 5:30 A.M. D.S.T. (see Journal) The sky was light at this hour, mostly overcast. No tattooing. At 6:00, a few yelps were heard across the lake; at 6:30, again. I saw a nuchalis fly from a poplar to a fir tree, where it was lost to sight. I went over to this spot about 15 min. later, and a nuchalis flew out of a poplar to a dead tree close by and tattooed twice, then flew off. These are the only tattoos I heard this morning, as of 7:30. Perhaps the sapsuckers are just as depressed by wet, gray mornings as I am. My impression is that in the

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Dry Lake, ft., 15 mi. N. of Princeton, B.C.

May 2 (cont'd) past few mornings they were most active around 8:00 A.M. (now 7:00 A.M. D.S.T.), when the sun was just beginning to shine fully into this little valley in which the lake lies. Tattoos were heard from dawn until then, though.

At 8:50 A.M., in the poplar grove at the north end of the lake, I came upon a nuchalis beginning to excavate a nesting hole in a big poplar, about 10-12 ft up. The cavity was just being started, and is only about bill-deep. At 10:45 I found another, in a poplar clump at the SW corner of the lake. This one is about 20-25 ft up in a big poplar, and my attention was attracted to it by a soft whine in response to my squeaking. This is the spot where the disturbed bird tattooed earlier this morning. A typical nuchalis was working. Counting the April 29 bird by Tulameen, this makes 3 nuchalis nests in the early stages of excavation. Of course, it may be that these will be abandoned and new ones started; often a nest tree shows several "false start" holes.

I returned to the 8:50 nest site at 1:00 and waited until 3:00, but the bird did not appear. Practically all this time it was raining or hailing, and both continued throughout the afternoon. I did not hear or see a sapsucker.

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Dry Lake, ft, 15 mi. N. of Princeton, B.C.

May 3 - 5:30 A.M. - Overcast, drizzling; no sound of sapsuckers. 6:00 A.M. - same.

7:45 - Rain stopped suddenly, sun came out.

At the SSW corner of the lake, I heard a sapsucker tattoo lightly close by. After standing quietly I located a bird at a hole about 25 ft up in a poplar. This bird certainly looks like a ♂; no trace of white on the throat. He began to work around in the hole, sometimes going all in except his tail. I couldn't hear any sounds of tapping, though, or see him removing any chips. Mt. Chickadees came up very close, noisy, but were ignored. A light tattoo came from nearby; again. No response. Then the ♂ yelped several times. After a few minutes more, with lots of preening, he flew off a few feet. In less than 5 min. he was back, poking in the hole again. Then he hitched up above it and tapped; then to a dead branch stub 6 in above and tattooed. Back to the hole he went. Tattoo from nearby - yelps from ♂. More tattoos. A few minutes later a ♀ (whitish on upper throat) came over, with squawking by both birds. Then both flew off, but not far. This may not be a real nest; I looked in vain for fresh chips, or any kind, under the tree. Of course, rain may have washed them away, but

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Dry Lake ft., 15 mi. N. of Princeton, B.C.

May 3 (cont'd.) I am still uncertain. This "nest" is about 150 yds. S. of the supposed one found in the SW corner yesterday. I went to this one for a few minutes, but did not see or hear a sapsucker. Walking farther north I paused and heard a tattoo just overhead. Sapsuckers seem to tattoo when one intrudes on their territory (close to the nest?). I did not find a nest here, but could easily have missed it. The bird I saw was nuchalis.

Back at my cabin (SE corner of lake) at 11:00 I heard tapping and saw a nuchalis working 25-30 ft up in a poplar right behind the garage of Mr. L. T. Smith, who owns the cabins here. The bird was getting its head all the way in. 11:25 Bird at the "nest" - looks like a ♂. He is now getting at least $\frac{2}{3}$ in. Every few moments he stops to preen, or just sit. 11:26 - ♀ arrives, alight above ♂; squawks; ♂ leaves, gliding off with a rattle (described April 29). ♀ looks in several times, begins tapping around just inside. Now she gets $\frac{2}{3}$ in; head feathers are mussed at each withdrawal. At 11:45 she stops work, preens, and then sits. 11:50 - scratches, preens. 11:51 - starts work again. 12:04 ♂ arrives, alights above ♀, who glides off with a rattle. ♂ then down to hole, starts work. This sequence of events is almost identical with that of the previous exchange of places.

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May 3 (cont'd.) There is a "false start" hole about 4 ft below the one now being worked on.

1:40 P.M. - ♂ at nest site at north end of lake, tapping, dropping chips. This is a shallow hole so far, only bill-deep. 1:45 - ♂ shifts around to left, to a false start hole a few inches away, taps in it, then to another a few inches farther left, then another few taps - suddenly flies down to ground, away. Yelps heard in distance. 1:58 - Yelps; ♀ (for sure) to nest site begins tapping at it vigorously, 2:00 P.M. 2:12 - ♂ to site, ♀ around to other side of tree; ♂ to left and below site, leaves; ♀ hitches back to site, stopping to look at the two false starts, begins excavating again. 2:26 ♀ leaves; ♂ not in sight, no sound heard.

Back at cabin, at 4:00 P.M., 3 sapsuckers were seen and heard in the usual squawk-chase. Intermittent tattooing was heard during and after. Sporadic observation of the nest site by the garage from 5:00 - 7:00 P.M. did not reveal a sapsucker. This may prove too busy a spot for them, but I hope not.

May 4 - Another drizzly morning. 9:15 - at nest site at SSW corner. Several tattoos and answers were heard close by, and 2 birds seen, but 20 min watch failed to find one at the nest. I moved to the SW corner site; at 9:35, one which appeared to be a ♂ came up and began work. This hole is a little over head deep.

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May 4 (cont'd.) The bird worked, with pauses for rest and preening, until 10:20, when loud yelps were heard, possibly from the working bird. He continued to work; another flew up close to him and squawked softly, then flew off. The working bird paused, then flew off also. I left.

At 11:00, one of the birds was working vigorously at the nest site back of the garage.

At about 2:30, I located another nest site — the fifth around the lake — it is on the west central side, in a poplar and (I think) cottonwood grove on a little promontary about 25 yds from the main growth. In a big, dead cottonwood, about 40 ft up, a sapsucker seemed to be just starting a nest. The hole was only about $\frac{1}{2}$ in deep, and as big around as a quarter, as near as I could estimate. Every so often it would tap around on either side of the hole, as if testing the quality of the wood. In about 10 min. I heard two series of yelps, and another bird flew over to the nest site from about 50 yds away; there were some squawks, and the first bird glided off with a rattle. The second looked around at some other, old holes close by, then started in to work. As in all nest sites seen so far, both birds seem to share equally in the work.

At 4:30 P.M., over about ⁵⁰~~200~~ yds east of the NE corner nest, I heard tattooing.

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May 4 (cont'd.) squawks, and saw one nuchalis. It was tattooing in the very top of a dead pine. Perhaps there is another nest in this area; I did not have time to check it today.

Again, work on the nest by the garage seems to have halted at least by 5:00 P.M. At 7:30 P.M., still no bird working on it, or seen nearby.

May 5 - 5:20 A.M. - heard tattooing. & 5:30 - again. 6:00 - Bird at nest by garage, half in, working. Tattooing heard about 100 yds west of this, and a bird seen. Nest not located. At the nest site at the SSW corner, a bird was at the hole, sitting perfectly quietly. Tattooing and yelps heard at SW corner site. Between this and the central western site, I heard repeated tattooing and saw one bird doing it, (a ♀, I'm almost sure), but could not locate a nest. Yelps and screams from the central western site indicate that it was being worked on - a bird was seen in the top of the tree. At the NW corner, about 9:00, there seemed to be a territorial dispute which raged over a couple of hundred yds., all south of the known nest site of ~~one~~ one pair. At least 3 birds, and two of these males, were involved. All was just as described often before - repeated tattooing, answers,

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May 5 (cont'd.), then one bird over to another, loud squawks, bobbing, hitching about, then one off to another tree, other(s) follow. This went on for about $\frac{1}{2}$ hr, and may have continued. An extremely light snow was falling during most of this.

3:15 P.M. - Bird ($\sigma^?$) at nest behind garage - working - all in but tail. 5:00 P.M. - 6:30: bird not at hole; they seem to quit working by 5:00, if not before. Intervals from 7:00-8:10 P.M. - bird not at nest.

May 6 - Day clear early, clouding up by 8:30 A.M. A few tattoos heard in the early hours. Around 9:00, I walked up to the SSW corner nest, and the f (white chin plainly seen) "challenged" me with several loud tattoos on a dead branch about 3 ft above the nest. The σ appeared opposite her on the branch, there were squawks, and the f flew off with a rattle. The σ seemed much disturbed by my presence and soon flew away.

I forgot to mention yesterday that several screams were heard at the ~~NW~~ corner and central western sites. Screams have been heard much more rarely than yelps.

May 7 - Tattoo heard at 5:15 A.M. See journal for weather. When a high wind was blowing, I noticed a sapsucker at the nest site behind the garage clinging

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May 7 (cont'd.) rather desparately to the side of the tree opposite the wind. Apparently the wind (about 20 mi./hr in gusts) was too strong to permit work on the nest exposed to it. At the NE corner nest site a bird was working about $\frac{1}{3}$ of the way in.

May 8 - Overcast at 5:30; ~~no~~ no sapsucker heard. At 6:20 I was down near the south end of Round Lake (the next one north) and heard several tattoos. Then, almost right over my head, a sapsucker flew to a poplar; there were squawks, and one flew off with a rattle, or rather glided off. This is really a sort of half glide-half-flutter, and it and the rattling call seem to go together. The bird that remained, a ♂, was nervous at my presence, and flew to another poplar a few feet away which had been freshly drilled for feeding. His nervousness was well founded, for I collected him then. As seemed likely, there was a nest site at the first poplar - about 18 ft up was a hole that looked about bill-deep. I waited, and in a few minutes the ♀ returned, alighting on a small branch 3 ft above the nest site. Here she preened for about 10 minutes, and finally hitched haltingly down to the nest site and began to work. I collected her too. The ♀ seems to be a bird of the

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May 8 (cont'd.) year, with many yellowish tips to the pectoral band feathers and the head striping not as distinct as in the ♂. My impression is that the ♂s have a more distinctly marked pattern than the ♀s. Both birds showed what I believe to be the start of a brood patch, although their gonads did not seem much enlarged; the oviduct looked rather enlarged, but not the ovary to any great extent.

The birds with the nest site behind the garage were at work at 6:00 A.M., around noon, and last seen there at about 3:30. From 4:30 on no bird was seen there.

At 4:40 I saw one ~~one~~ feeding in a very large poplar, about 40 ft up. This was behind my cabin, about 75 yds from the garage nest. I watched for 20 min, but the bird did not leave or otherwise reveal a nest site.

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May 9 - see journal for account of the countryside. At about 5:00 P.M. I was up on an open slope, somewhat burnt over, with lots of large dead stubs, and I heard a sapsucker screaming. It was a perfectly typical rober up in the top of a tall dead tree, about 50 ft high at least. The bird was tapping in one spot, possibly a nest site, and screaming

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May 9 (cont'd.) - occasionally. After about 15 min it flew off to another dead stub, then off to a clump of live pines, high up. I had a fine view of it, in sunlight from a favorable angle, and there is no doubt that it was typical ruber. Perhaps this race prefers the coniferous areas and leaves the aspen groves to nuchalis; we shall see.

May 10 - On top of hill opposite Falls Auto Court, 6:20 A.M. - heard several screams, could not see bird. At 6:30 I walked north along the top of the ridge overlooking the road, and a sapsucker screamed and then yelped from a dead pine top about 60-75 ft up. It looked at me nervously (I was directly below) and then tattooed weakly once or twice. In a minute or so another bird flew over to it, they squawked, and the second one flew to another dead tree, same height, about 40 yds away, where it seemed to be picking insects (ants?) off the tree. Both these birds were nuchalis or very close to it; I could see distinct head striping even against the light gray sky. Then I heard distinct tattooing to the south, and 200 yds away, at the top of a burnt stub 40 ft high, was a typical ruber. He (it) tattooed about 5 times, without answer. Then it flew in a wide arc

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May 10 (cont'd.) to the top of a dead tree 60-75ft high about 400 yds away, and then I lost sight of it. A Flicker alighted on its tattooing stub ^{then flew.}

7:15 A.M. Farther northwest on the ridge, I heard loud, repeated tattooing and came upon a bird some 20ft up in a dead fir, on a broken branch about 8" long. This bird is, I believe, an intermediate, and I had a perfect profile view against a green background. It has a short white post-ocular stripe and a thin pectoral band, but the auricular patch and the black separating the crown from the nape were almost obliterated by red. Of course, it can be a very red nuchalis. At 7:22 the bird flew down a draw, out of sight. 7:30 - loud repeated tattooing by 2 birds; I began to hear squawks; one then flew by, closely followed by a typical ♀ nuchalis. Then both flew away. 7:37 - tattooing again - from the ♂ n possibly > r - on a dead lodge-pole pine. Screams and a sort of scolding were heard in the distance. Now he flies to another dead tree 100 yds. away. More tattooing - I find the same bird ^{presumably} at a lodge-pole again - answering tattoos - less often and not as loud. - from about 50 yds. away. Finally a bird yelps in the near distance and he flies over to it, Squawks. Then I see a ♀ fly by to the top of a dead stub 30ft. high - she tattoos once -

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May 12 (cont'd) barely audible - then flies off.
8-8:20 - silent. then tattoos begin again.
Finally I catch sight of a typical group of nuchalis - 4 birds, then 3, and the same tattoo - get together - squawks - one off - others follow - as has been described before, but here it is in the open slope dead pine and fir country. At 9:15 I heard tattooing on another slope farther south. it went on for a few minutes, then stopped for 15 min. intervals. This went on for an hour. Finally I found a ♂ nuchalis tattooing loudly on a lodge-pole pine (dead). He flew off, and I heard yelps in the near distance, 10:15. (Presumably) this same bird continued to tattoo in this area, often from the same tree, for another half hour, but with no response.
At 11:00 I came out on the open slope where I saw ruber yesterday and earlier this morning. I heard a few screams, and a ruber appeared, flying over to a lodge-pole and tattooing at a height of about 15 ft., precisely as the nuchalis do. The woods are full of these dead, leaning, lodge-pole pines (I will call them just l-p's) from which most^{of} the branches are gone, as well as the bark. Little stubs project out an inch or so where the branches were, and these are favored for tattooing. The bird leans

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May 10 (cont'd.) over from the bole on which it is perched and gives a tattoo on the branch-base stub. The ruber then flew to some live Doug Firs, and another sapsucker flew out from where the ruber had gone in. I got only a glimpse of this bird, but it seemed to be nuchalis or close to it. I heard no sound from the sapsuckers. After about 5 min. of working from tree to tree, a ruber (same one?) came out and flew to the top of a very high dead Fir, screamed, flew to another, and I lost sight of it. This observation was from 11:00 - 11:30.

From this morning's evidence, there are at least 2 pairs and one possibly unmated ♂ nuchalis in the immediate area, and at least one ruber. Territories do not seem to be definitely fixed as yet, and it seems very unlikely that nest construction has been started yet, unless the ruber has a nest.

In the afternoon I went to Copper Creek and the area behind Tower's Ranch-Grill (see Journal), but did not hear or see a sapsucker.

At 7:45 P.M. I went up to the ruber territory above here and waited until 8:30, but there was no sight or sound of sapsuckers.

May 11 - 5:30 A.M. - On top of ridge opposite Falls Auto Court; heard screams first at this time, then yelps. The screamer was off in the

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May 11 (cont'd) top of a dead fir, and I could tell little about its color. The yelper was close enough though, so I could see it was nuchalis. It flew over towards the other, and both flew out of sight into the woods. At 5:40, tattooing began over in the area where I saw 2 pairs of nuchalis yesterday. The sapsuckers were quiet until 6:00, when more yelps and tattoos were heard. A ruber came out of the woods into the area of dead trees. It screamed and flew over to a dead stub near me, and a typical nuchalis followed and alighted next to the ruber. There may have been soft squawks; the ruber reached over and gave the nuchalis a very gentle peck on the neck. Then the r. glided off with a rattle. There was no show of aggression, but I cannot be sure of the sexes. The n. remained until 6:20 in almost the same spot, preening and picking at the bark. I glanced away for a second, and it was out of sight, either back of the tree from me or gone. I heard yelps in the near distance. Others began to yelp and tattoo about 6:15. There seems to be a 15-20 min. period between bursts of noise-making. 6:30 - ~~A.~~ at Yelps from close by; r. appears at the dead tree; n. still there; r. glides off with a rattle. N. hitches around, looks in a couple of holes about 20 ft. up. A Flicker alights on the tree above n., who takes notice but no action. The Flicker (♂)

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May 11 (cont'd) leaves. N. back behind tree.

6:37: R. appears 50 yds from "n's tree," works about, just looking; flies over to a Flicker which is tapping, and seems to chase the Flicker; then it chases r. R. goes to a stub just like the one n. is on, looks in a hole several times; then over to "n's tree," crown feathers raised. No squawks heard. N. leaves with a rattle. In a few moments, r. leaves also, in a different direction. 7:00 A.M. I am now on the north side of the tree, approximately; n. appears quietly, goes right to a hole about 5 ft from the top and 25 ft from the ground, facing west, and begins to dig. It is already deep enough for n. to get half-way in, and the bird works vigorously, pulling out beakful of chips, and then resting quietly and looking around. At 7:12, during one of these rest periods, there are yelps from down the slope. In a minute or so, n. flies off in that direction. I am fairly sure that n. is a ♀, as the upper throat looks whitish, but I will have to get a better look to make sure. It is, of course, certain that r. is the mate. 7:17 - tattooing in the near distance, farther up the slope. 7:20 - R. at nest, begins work immediately; then stops for a few minutes of preening, then starts work again. 7:35 - Screams, not sure from which bird; n. up to nest by direct flight, crown feathers raised, bobs slightly, squawks; r. stays at nest; n. flies off; r.

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May 11 (cont'd) looks around, then glides off with a rattle. 7:55 - Repeated tattoos from the same place they were heard at 7:17. 8:00 - The tattooing bird, a ♂ nuchalis, flies over to a dead tree about 60 yds from the r-n. nest site. What I take to be both are there - much squawking, "crest"-raising. R. chases the ♂ n. for a few feet at a time; ♀ n. follows. R. tattoos; ♀ n. answers; ♂ n. silent. ♂ n. flies over 50 yds, to what I presume is his territory; in a moment r. follows. Squawks - I believe ♂ n. now chases r. back to within about 80 yds of "his" nest site, to a ~~young tree~~ ^{balsam}. Then they go lower to a dead stub, and r. chases ♂ n., who flies back about 50 yds to his own territory, and begins to tattoo. R. goes to the ~~tree~~ ^{balsam} and begins feeding; it has been used before, and has long streaks of yellow sap running down it.

I cannot be absolutely certain of the sexes of the above birds, but I am as sure as I can be without collecting them.

8:20 - R. just arrived at nest, working. The bird has a white post-ocular spot, as a few ruber have occasionally, but almost always ♀s. 8:24 - yelps; r. keeps on working. 8:25 - more yelps; n. to nest from north, alights by r., who keeps on working. N. then off to north, alights low. R. leaves nest, flies by. Both go over to a stump ^{over} the base of which a little stream flows

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May 11 (cont'd.) - r. down to the water; bathing or drinking?
Both fly into the woods, out of sight. I leave.

A search for sapsuckers in the late morning in the region over Allison Pass was fruitless.

3:28 - at the r.-n. nest tree. R. is working half in at a hole almost exactly opposite the one of this morning, which makes me wonder if the birds know the difference. 3:45 - R. seems bothered by the sun in its eyes; shifts to shady side of tree, preens for 5 min.

R. back to 2nd site for a moment, then hitches up to the top of the stub, looking in holes on the way up, pauses at the top, flies off to the woods to the west, 3:52. 4:36 - R. back to 2nd site; screams 4 times; begins work. 4:55 -

hitches to shady side, up to near top of trunk, off about 50 yds, then off out of my sight.

At 6:00 P.M., neither bird had come to the nest tree, and I left.

May 12 - I went 5 miles south on the road to Hope to a spot that to my eye is very much like the one above the Falls, and I arrived there at 5:25 A.M. A sapsucker was tattooing loudly at road level, but across the river and behind a clump of trees, and I couldn't see it. I went on up the slope, which is a gully with dead burnt fir and pine trees, and a live forest on either side. At 5:50 I heard some tattoos, but a roaring stream down the draw made it impossible to localize the sound.

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34 mi. SW of Princeton,

ft., British Columbia

May 12 (cont'd.) - Between 7:00 and 8:00 A.M. there has been much tattooing with answers and yelps and screams, but I have seen only one bird - a tattooing ♂ nuchalis. He tattooed steadily for about 5 min., and there were several screams and yelps from about 50 yds away. He finally flew over ~~from~~ to where these sounds had last come, alighted, glided off with a rattle, went up the slope, and began tattooing again. I did not see the 2nd bird. Tattooing began again in about 20 min, right up at the top of the ridge. I went up and found a ♂ n. at a dead l-p. In a few minutes he flew over to a small aspen (one of several nearby) which was freshly tapped. Then he went on to another l-p. and tattooed. I walked 50 yds down the slope to where most of the yelps had come. A ♂ n. flew off from a fir, and did some flycatching. Then he went back to a dead fir about 40 ft high, broken top, and went to a hole about 8 ft down from the top. In a few minutes a ♀ n. appeared, (blurred head-stripes, whitish upper throat) and went to the ♂; there were soft squawks, and the ♀ hitched up to near the top of the stub and preened. As this was an obvious nesting pair, typical n., I left. The ♂ was about half-in the nest hole. Farther down the slope I heard and saw several more n.'s, but there is no way to be certain that

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May 12 (cont'd.) they were not of the same pair. Territories seem to be larger than in the aspen groves in Modoc Co., as the birds seem to have at least a 200 yd. diameter territory. Perhaps it will shrink as nesting proceeds, or perhaps it is larger as the country is more open, with long visibility for spotting rivals. At 10:20, sapsuckers across the river were still tattooing loudly and squawking 10:30 - again; now one flies over the river to this side and across the road - 250 yds. It is clearly nuchalis.

There does not seem to be much point in being out at dawn. The birds seem just as noisy and active from 7:00 to around 10:00, if not more so, than when they have just come off the roost. Also, the visibility is a lot better after sun-up.

~~7 mi. E. of Hope, ft., B.C.~~

Hope to Princeton Road, British Columbia

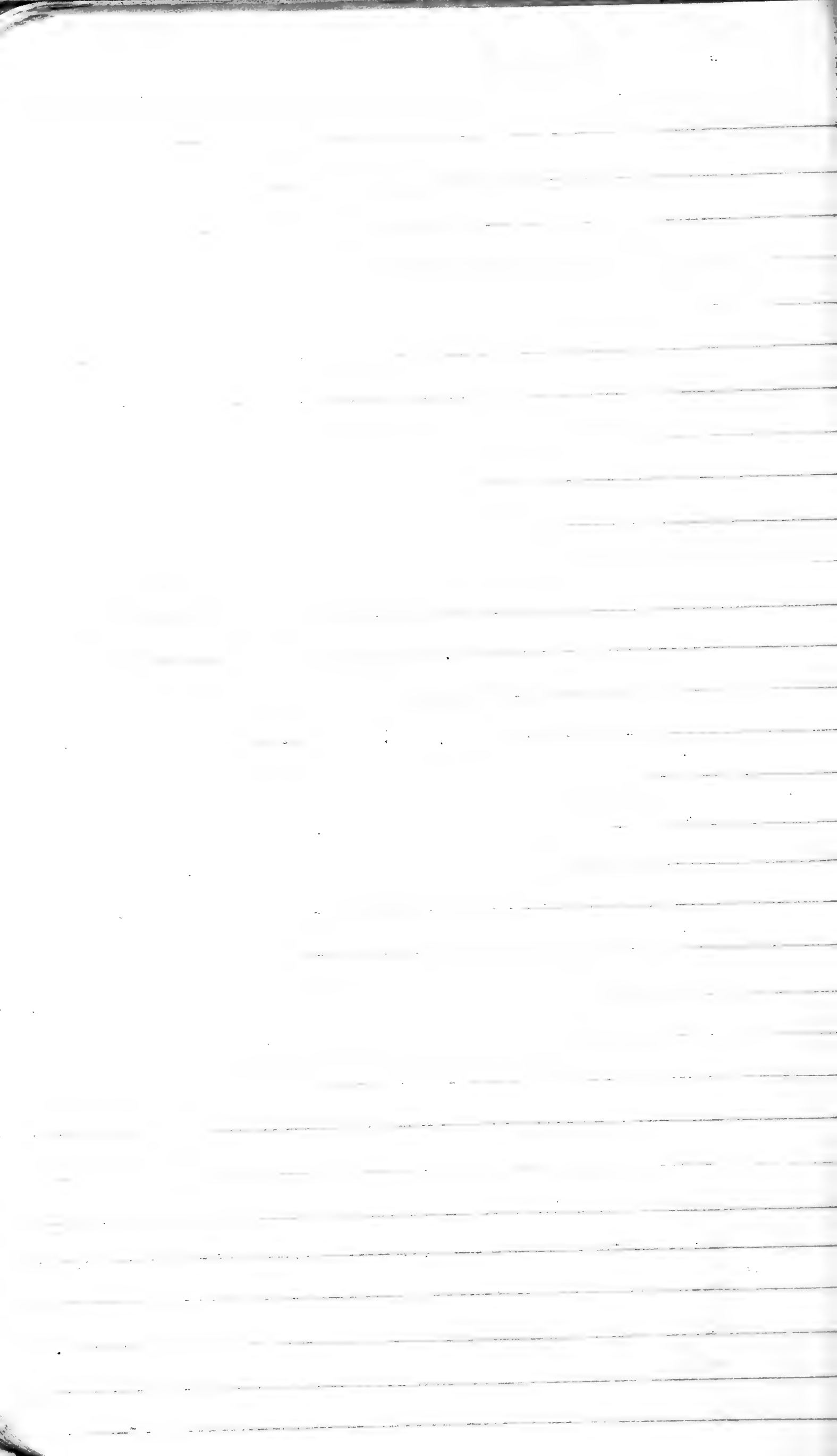
May 13 - I spent last night in Hope and this morning started out at 5:30 to see how far east ruber ranges. 7 mi. E of Hope I heard tattooing from dead firs up a steep, mossy, litter-covered slope. After an extremely slow climb I was only half way to the birds, and I gave up, especially as they were almost certain to be ruber so close to Hope. This was from 6:30 to 7:00, the sky was still mostly overcast. Two

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Hope - Princeton Road, British Columbia

May 13 (cont'd.) ~~no~~ more stops at likely-looking spots, 9 mi. and 18 mi. E. of Hope yielded no sapsuckers. At ~~22.8~~^{22.0} mi. E. of Hope, I was exceptionally lucky. At 8:15 it was clear and sunny, and at this point the road goes up rather steeply through fir and cedar. Along the river there are cottonwoods, and I listened for 15 min. without hearing a sapsucker. Then one flew up silently and alighted on the bole of a large hemlock, about 40 ft up. In a moment another flew to the first one; there was squawks, and crown feathers raised. The first moved out a couple of feet on a branch and perched cross-wise. The second mounted her and copulated. The copulation lasted only a few seconds, and there seemed to be no resistance by the ♀. The ♂ was mounted on her at a 45° angle. He flew off about 60 ft, and the female preened for a minute or so. Then she flew off past the ♂, and he followed. I lost sight of them. Except for the squawks when the ♂ first came up to the ♀, neither bird uttered a sound. About 20 min. later, a ruber yelped from the top of a dead fir as I passed under it, then flew to another dead tree, then out of sight in the forest. I heard more yelps. This was so close to the first observation that I



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Hope-Princeton Road, British Columbia

May 13 (cont'd.) feel fairly sure it was one of the same birds. Thus, a mated pair of typical ruber occurs a few miles west of Allison Pass, which is 4403 ft. At the same spot I also saw the coast Red Squirrel (which has an orange belly in contrast to the white-bellied interior form). This record is 34 miles west of where I have found typical nuchalis; now I must narrow down this gap. It seems likely that the summit crossed by Allison Pass is the main barrier in this region.

29 mi. SW. of Princeton, ft., B.C.

May 13 (cont'd.) At 3:40 P.M., r was working at the nest site which faces approximately east (the 2nd one). r. continued until 3:47, when it hitched up to near the top and flew off. At 3:56 I heard a tattoo from that direction. At 4:22, r. returned and began work again. The bird was getting from $\frac{2}{3}$ to $\frac{3}{4}$ of the way in (beyond the white wing stripe) by 5:15, when r. again hitched up to the top of the stub and remained there for several minutes; at 5:20 P.M., when I left, r. was still there. I have not seen n. work in the afternoon.

May 14 - I am walking roughly NE from the Falls, along the ridge above the road. From 6:30 A.M. until 7:20, no sound of sapsuckers; then in an aspen grove in a wet spot in the pines, a nuchalis sounds off from

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May 14 (cont'd.) the branch stub of a dead aspen, about 20 ft up. It tattoos repeatedly, finally gets a faint answer at 7:36, about 75 yds away. He continues to tattoo, but no more answers. At 7:44 a ♀ nuchalis alights on a cottonwood a couple of feet from the dead aspen, right opposite the tattooing ♂. After a moment's pause, he flies at her, and they go chasing off through the trees out of sight. I did not hear any sounds or cries. At 7:45 there is another loud tattoo from the direction in which they went.

At 7:50, a bird tattoos from the same branch stub as where the ♂ was, but it is not the same bird. I am practically certain it is a ♀ but I can't be absolutely sure. It has blurred stripes and seems to have a whitish chin. Answering tattoos come from the 2nd spot mentioned above. Tattoos and answers go on for 5 min., and then the ?♀ flies over in the direction of the answers. Silence. Then, as I move on, more tattoos.

A ~~to~~ couple of hundred yds. further NE is a marshy pond about $\frac{1}{4}$ mi. long and about half that wide. There are many aspens around it but I did not hear any sapsuckers. Pine and fir-covered ridges rise steeply on either side of the pond, to the NE and SW. On top of the NE ridge, at 8:40, I saw a nuchalis flying silently from tree to tree. The sun came out fully about 10 min. ago; before then

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May 14 (cont'd.) there had been light clouds - a "buttermilk sky." Now, at 8:45, it is completely clear. I crossed to the SW ridge, and at 9:25 I heard squawks and saw a pair of nuchalis hitching around on a dead fir. They became silent, and flew to live trees in opposite directions, the ♂ quite near to me. They worked on to other trees, and I did not see them again.

11:30 - at the r-n nest site. At 11:40, r comes to the tree, hitches up, down and around the trunk above the nest site several times, then begins to work on the NE site, which seems to be the permanent one, 11:47. A good look at r shows a trace of a post-ocular stripe, but not enough to call the bird an intermediate. I have not seen n at the nest site ~~for~~ since the day I discovered it. This has only been 3 days, however, and I have not watched the site in the earlier hours of the morning.

From here to Copper Creek, then, I saw two pairs of typical nuchalis and possibly more.

This form seems to occur in the dead conifers on the tops of the ridges as well as in the aspens. A ruber this far over must be just an occasional stray.

50 mi. SW of Princeton ft., B.C.

May 15 - 5:45 A.M. - clear, cold; ice on most quiet pools. Sun on tops of ridges about 6:00.

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S. varius ssp.

50 mi. SW. of Princeton

ft., British Columbia

May 15 (cont'd) This area is the north end of "The Burn," where fire occurred in 1945. It 2 mi. SW of Allison Pass. There are still drifts several feet deep in the woods, but the crust is hard enough to walk on. Between 6:00 and 6:30 I heard several loud tattoos — at least 2 birds were involved — but failed completely to get even a glimpse of one. This was most exasperating, especially when a bird tattooed several times directly overhead, so loudly that it startled me. Try as I would, I could not see one. I waited at this spot until 7:00, but there were no more tattoos. My feet were so cold from standing on the snow that I felt I had better walk down to the road again. In a few minutes I went back up on the drift-covered slope and strolled around until 8:50 A.M., but did not hear a sapsucker except for possible screams in the distance, about 7:30. I looked for sapsuckers at several likely spots on the way back to the Falls, but did not see or hear any.

May 16 - 5:35 A.M. - at the same spot. The road at this point runs roughly north-south, and snow-covered ridges rise steeply on either side. On the west ridge there is more live timber than on the east. At 6:00, as the sun was just about to come over the east ridge, a sapsucker tattooed from the west side. This was repeated several

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50 mi. SW of Princeton,

ft., British Columbia

May 16 (cont'd.) times, and then tattoos started from the east side. The sky is clear except for a haze on the horizon, and the sunlight was just then touching the tops of the ridges; the tattoos were from the level of the road, or slightly above it. At about 6:10 A.M. I caught sight of a bird on the east slope as it flew from one tree to another. It was definitely an intermediate. its head striping was thoroughly suffused with red, so that it almost seemed red-and-white rather than black-and-white. Loud yelps came from across the road, to the W, and the bird flew over there. In a few minutes one sapsucker followed by another flew back to the area on the E slope, and tattooing and answering began between them. Again, I was completely unable to see either of them although I got quite close. The snow is deep and soft in amongst the trees, and walking is clumsy and noisy. Promptly at 6:30 tattooing stopped. At 7:40 I heard very distant yelps, as the sun was just reaching down to road level. 8:23- tattooing began on the E. slope; yelps answered from near the road or across it. A few more tattoos, and a nuchalis, typical, probably a ♂, flew out to a hemlock and began to drill it and feed. After a few minutes of this, it suddenly flew a couple of hundred yds. down into the woods. There were a few yelps, then silence.

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61 mi. SW of Princeton, ft., British Columbia

May 16 (cont'd.). This is the place (22 mi. E of Hope) where I saw a pair of ruber on the 13th of May. I got here at 9:25 A.M., and a sapsucker tattooed twice nearby, but I could not see it. This is 13 speedometer miles from where I saw typical nuchalis and an intermediate this morning. As Corvus flies, it is less than that. It may well be that nuchalis is more aggressive and is colonizing "the burn" even if it is over the pass - that is, west of Allison Pass. I started back in the direction from which I came, and stopped after about 6.5 miles at a spot where it looked as though I could walk around a bit. This was an l.p. pine, Doug fir, red cedar forest; it was rather moist, with much moss on the ground and a pale green moss hanging in streamers (like "Spanish moss" in SE U.S.) from the branches. In a few minutes a typical ruber came into sight, seemingly accompanied by a ♂ Hairy Woodpecker. The ruber worked rapidly from tree to tree, keeping rather low, usually not over 5 ft above the ground, tapping a little and apparently feeding. The Hairy drifted in the same direction, but they didn't seem to notice each other. There were no cries, and the ruber was soon out of sight. This point is exactly 6.6 speedometer miles from the first place where I stopped this morning.

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Hope - Princeton Road, British Columbia

May 16 (cont'd) - The road runs through Manning Park in a sort of a "W^WE". The Falls is near the upper right limb of the figure, and Allison Pass is a little way up the ascending limb on the left (W) side. At the Pass, 4402 ft., with slopes rising to 6000 and 5500 ft. on either side, the forest is mostly lodge-pole pine, locally called jack-pine. Beyond the pass to the west is the 1945 "burn." Mr. R.F. Boyd, the Park Ranger, says that the burn occurred at just about the place where the coast forest blended into that of the interior. The red cedar is a good indicator of the coast forest, and it comes right up to the western edge of the burn. On both sides of the pass there is Engelmann Spruce, Hemlock, Balsam, ~~and~~ Douglas Fir, and Lodge-pole Pine. It is possible that the 1945 fire burned out the area of intergradation of the sapsuckers, at least that along the road. The road follows the Skagit Creek (= Cedar Creek) and there are enough cottonwoods along the creek and live conifers scattered through out the burn to permit a continuous sapsucker population, but it could make for small contacts and very limited interbreeding.

Now I want to record my impressions of the ruber that I saw at close range today. Ruber looks definitely larger than nuchalis

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Hope - Princeton Road, British Columbia

May 16 (cont'd.) as large as a Hairy. It is very dark-looking and no stripes show through the red of the head. The back and wings appear almost all black except for the longitudinal white wing-stripe. The ruber that I have been watching at the Falls seems less typical in comparison; it really looks like a daggetti more than a ruber, which may indicate a bit of nuchalis in its ancestry.

29 mi. SW of Princeton, ft., B.C.

May 17 - 7:20 A.M. Sunny and cloudy after a night of rain. - At the r-n nest site; 7:22 n up to tree, r. leaves with a rattle from the other side of ~~me~~ the tree from me. After a minute or so of hitching up and down, n. goes to the other side too. A third hole is being excavated, on the north side, between the other two. N. gets about half way in. 7:30 - Tattoos and yelps in the near distance; n. goes on working. Flickers are calling loudly close by - now a pair flies over to the dead tree about 5 yds from the nest site. R. immediately flies over and alights on the same tree above them, "crest" raised, but no sound. The ♂ Flicker, the one highest up, about 10 ft from r., moves down a few feet. R. continues to look aggressive, tattoos very lightly once. In a moment the Flickers leave. R. goes to a scrub alder 30 yds from the nest site; n. has sat quietly all this time. Now a ♂ sparrow hawk alights right where the

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29 mi. SW of Princeton, B.C., British Columbia

May 17 (cont'd.) Flickers were. At the same time there are tattoos in the near distance. N. and R. both seem to be nervously alert; the little hawk is just sitting quietly. N. hitches away from the nest and to higher up on the tree. R. flies over towards where the tattoos came from, about 100 yds. The Sparrow Hawk leaves. N. goes over to the tree where it was, hitches up to the top, flies off. This is about 7:45 AM. At 7:55, R. flies to that tree, hitches around out of sight at 7:58, R. comes down to the nest site (the new one), and begins work. 8:05. R. gets $\frac{2}{3}$ of the way into the nest, comes out with a beakful of dark-looking chips. 8:08 - N. to nest, R. glides off with a rattle to the balsam tree where he went during the Sparrow Hawk incident; it is running with pitch. Then N. flies over to the little scrub alder (?) 30 yds from the nest, and taps at what looks like a very fresh, first working. As I am close and the light is favorable I can see that N. is definitely a ♀, with a clear white chin and whitish upper throat. She screams once, then flies off from one dead tree to another. 8:17; a tattoo, and R. comes up to the nest, starts work. 8:28 - ♂ Sparrow Hawk comes by again, alights 20 yds. from nest. R. seems to notice him, hitches away from nest, bobs, screams several times, "crest" up. The hawk leaves, although he took no apparent notice of R. Distant tattoos. 8:33 - R. leaves, screaming. 8:53 - R. goes by 200 yds from nest, from the top of one tree to another, screaming. Then he

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29 mi. SW. of Princeton ft., British Columbia

May 17 (cont'd) flies out of sight, at least $\frac{1}{4}$ mi. away.

9:00 A.M. - yelps from n., 100 yds from nest. 9:02 n. to nest, preens. 9:13 - n. begins work. 9:24 - r. up to nest, then leaves with a rattle; n. leaves after a pause. The ♂ seems to do most of the work on the nest, but it is clearly not an all-day occupation. I don't know why they keep changing the site unless the direct sun bothered them at the other two.

56.6 mi. SW of Princeton, ft., B.C.

May 18 - 5:50 A.M. It is snowing moderately, and apparently has been for some time. This is the spot where I have found ruber farthest east, except at 29 mi. SW. I stayed in the woods until 6:30, and as I heard only a Pileated drumming and as the snow began coming down heavier, I came out. This is a good-looking spot for sapsuckers, though - lots of green timber, but with stands of large dead trees too. At 7:00 I was at a point 1.7 miles E. of where the road crosses Cedar Creek; this is about the western edge of the Burn, and I stayed until 8:35 looking and listening. At about 8:00 I thought I heard sapsucker cries, but they were not repeated. The timber here is mostly Hemlock with l-p. pine and a little Red Cedar. It was still snowing lightly. At 9:00 I was at 22 mi. E of Hope, where I first saw a pair of ruber. As I stopped the car I saw one, and it screamed a few times and flew off. In the next hour I heard yelps several times, but did

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22 mi E of Hope, ft., British Columbia

May 18 (cont'd) not see another bird. The forest is full of soft snow here and walking is very slow. At 10:00 the weather had not cleared at all, so I started back to the Falls. It was not a very successful morning, and I would like to blame this fact squarely on the weather.

May 19 - see Journal for account of morning's activity. No sapsuckers seen or heard.

29 mi. SW of Princeton, ft., B.C.

May 19, also. In the afternoon I went up the slope where the mixed nest is. Several hundred yards from it I scared up a ♀ nuchalis with a very white throat; only the lower $\frac{1}{3}$, it looked like it had any red at all. I arrived at the mixed (r.-n.) nest just before 3:00 P.M., and at 3:10 ♂ came up to the north-facing hole, the 3rd one on which I have seen them work. It was present, however, at the time I first found the pair. Today ♂ was going all the way in the hole, completely out of sight, but apparently there is not yet room to turn around as he backed out laboriously every time. When he withdrew, he would toss a beakful of light yellow chips with a shake of his head, and the wind whipped them away like a puff of smoke. At 3:25 n. came up to the nest tree, alighted, and hopped over to ♂, who continued work for a moment, and then rattled off. N. paused, then rattled off also. I waited until 4:00 P.M., but did not see either one again.

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29 mi. SW of Princeton, B.C., British Columbia

May 19 (cont'd.) The "rattle" seems to be characteristic of a bird leaving a nest site, as I do not recall hearing it at any other time. Also, it seems that if the bird working at the nest does not stop when its mate arrives, it loses its chance to be replaced, so to speak, and the mate leaves. This is not invariable, of course, but I have seen it often.

May 20 - no sapsuckers seen or heard in the morning; weather lousy. See journal.

At 4:15 P.M. I was at the r-n. nest. at 4:17 r. appeared, hitched about and preened, but did not work. Then 2 tattoos were heard; r. screamed 5 times after the 2nd. At 4:32 n. came over to the tree; r. then began to look in the nest, and n. left with a rattle; then r. left. I heard squawks, screams, and yelps, and some tattoos — this was from about 200 yds E., where there is a nuchalis territory. I went over this way, and heard squawks close by. N. was perched crosswise on a branch, and r. approached her lengthwise, his crown feathers up, and mounted her; n. was facing towards me, and had her head laid far back between her scapulae. I was too close, and r. seemed to notice me, climbed off, and flew away. N. remained in the same position for a moment, then began preening. It was now 5:00 P.M. More tattoos came from nearby, at a place about 150 yds from the r-n. nest. One bird tattooed

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May 20 (cont'd) loud and often, the other only seldom. Finally they got together with a burst of squawks, but where I couldn't see them.

Tattooing began again farther from the r-n. nest. Then a ♂ n. flew to the same tree where the birds were a few minutes ago, and a ♀ n. followed. The ♂ looked alarmed at my proximity, and he flew about 30 yds to a large spruce. I left then, 5:15 P.M. Neither r. nor n. were at their nest as I passed. It was darkly overcast and drizzly the whole hour.

* 50 mi. SW of Princeton, B.C.

May 21 - 5:45 A.M. - Darkly overcast and raining; I will sit in the car and listen for tattoos. I stayed until 7:55, with no results. See Journal.

29 mi. SW of Princeton, B.C.

May 21 (cont'd) It rained sporadically until about 3:30 P.M., and I went up to the slope just west (about 1/4 mi.) of the one where the r-n. nest is, and from which it is separated by a slight ridge covered with live trees. I left my watch in the cabin, but I estimate that the following observations were from 4:00 to ~~5:00~~ 5:30 P.M. I heard squawks, and was surprised to find a ruber and a nuchalis (sex?) working about low on the dead trees. They separated, then the n. followed the r., and it came over to the n.; there was bobbing and squawks, r. seeming slightly aggressive. The r. flew far down the slope, about 300 yds. Both

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May 21 (cont'd) birds screamed back and forth a little. The n. flew up the slope to a broken-off dead tree and began to work in a nest-site, into which it got about $\frac{1}{3}$ of its body. I did not see the r. again, but heard two tattoos from that direction later. The n. worked steadily for what seemed like half an hour, then flew off with a few screams.

I strongly suspect that this is the same r.-n. pair, if it is a pair. The ruber looked exactly like the previously-observed one, with a faint white post-ocular mark. The nest site is in a dead stub which is of the same size and at the same level as the one on the other slope, and the site is at the same height.

I will have to look into this further tomorrow.

May 22 - 8:50 A.M. (overslept) - at the spot just described. Yelps, a bird to the nest site, one leaves with a rattle; I am too close, the other leaves silently. 9:15 - typical nuchalis to nest; it yelps. Another typical n. comes up - squawks - one leaves silently. The remaining one goes right to work, getting $\frac{2}{3}$ in the nest. As both birds are typical, it is likely that r. wandered into this territory yesterday and is in no way involved in this nest. 9:24 - this bird flies 200 yds down the slope. Another appears; they get together and squawk. Then they work up the slope, 100 yds or so past the nest. More squawks. At 9:29, a tattoo. 9:37 - Yelps from up the slope; now both birds to nest - squawks - one leaves, the other begins to work. I leave.

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May 22 (cont'd.) 10:20 A.M. - at r-n. nest. 10:25 - r's head appears at nest opening, and he proceeds to toss out about 35 beakful of chips, then draws back in. 10:32 - this starts again; it continued every few minutes until 10:55. At 10:54, I heard a scream. At 10:55, n. hatched up to the nest from below, and looked in. No response. She went to the side and waited. The wind was blowing strongly and I could hear nothing else. In a moment r. squeezed out and flutter-glided away. N. went to the nest and went in. About 5 min. later I saw a bird beside the nest, and it flew off. This must have been n., for at 11:48 r. returned to the nest, went in, and started throwing out chips. (to town in afternoon).

53 mi. SW. of Princeton, ft., B.C.

May 23 - here at 5:35 A.M. - overcast, occasional extremely light snow. At 6:10 a bird tattooed from near the top of a dead tree by the road, and repeated until 6:15 or 6:20. It was typical ruber. At 6:20, it flew across the road into heavy timber; a few minutes later, I heard yelps from that direction. At 8:00 I had crossed the river and was near the "yelp" spot. I heard squawks, and there was a ruber. It seemed curious, and flew over to within 10 yds of me. There were screams close by, but I could not see the birds head at that moment and was not sure that it or another uttered them. This ruber showed faint traces of head striping under its red at

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53 mi. SW of Princeton, ft., British Columbia

May 23 (cont'd.) close range, but I would not call it an intermediate. I think probably all ruber show this, as it can be made out in skins. The bird moved to several other trees, worked at feeding diggings on a hemlock, and flew down into denser timber, out of sight. I waited until 9:00, but there was no further sign of sapsuckers. A 3-toed woodpecker, (♂ - P. tridactylus) was close by, feeding, but neither he nor the ruber took apparent notice of each other. This observation was on a slope at the edge of a burned area, and probably not over 200yds air line from where I first heard the tattoos. West of here is plenty of green timber, but there is very little visible from the road until a spot 3 miles E., where I have seen nuchalis. The intervening area is all burned. It may well be that the Burn is an effective barrier at this particular junction of the ranges. There are numerous Red Cedars here; I have not seen them east of the burn, although there are probably a few.

50 mi. SW of Princeton, ft., B.C.

May 24 5:30 A.M., clear, cold (see Journal). I stayed here until 6:45 and no sapsuckers were heard. It was so god damned cold that I could hardly persuade myself to walk around, and I didn't much. I moved to 22 mi. E of Hope, where the sun was shining at road level, and arrived at 7:15 A.M.

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22 mi. E of Hope, ft., British Columbia

May 24 (cont'd.). Not until 8:45 did I find the ruber that has a territory here. One was feeding on a hemlock about 8 in. in diameter. Hemlocks and balsams seem to be favored. The bird moved around from tree to tree, usually sticking to hemlocks, but not at all strictly. It made several flycatching forays out over the road, and finally moved down 170 yds where it did the same thing, and finally alighted in a small clump of willows. Here it tapped and did more flycatching, then flew to a huge live fir. There were screams, and the bird disappeared. It is annoying not to be able to find this nest as the birds are so obviously close to it. This is an area of really huge timber, though, and it is very easy to lose sight of a bird on just a short flight. I left at about 10:15 A.M., stopped and listened at 50 mi. SW of Princeton, but heard nothing.

29 mi. SW of Princeton, ft., B.C.

May 24 (cont'd.) - At the r-n nest at 3:15 P.M. At 3:28 ♂ arrived, looked in several times, went in. Occasionally he threw out chips, or screamed from the nest. After about ~~an~~ 2 hour he came out and hitched up to the top of the tree and stayed for 15 min. before flying off. I heard tattoos twice from that direction, and some yelps, but neither bird came to the nest again while I remained, which was until 5:15 P.M.

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50 mi. SW of Princeton ft., ~~2000~~ British Columbia

May 25 - 7:30 A.M. - clear, cold. I walked around in and out of the snow here where I had found nuchalis farthest west, but did not see or hear a sapsucker. I crossed the road and went up the opposite slope, which is similar but more open, with less snow, 10:15. Almost immediately I saw a nuchalis, going from dead tree to dead tree and catching the numerous flying insects that came out in the warm sun. There were screams, and another sapsucker came up; I could not see it well but I am almost sure it was ruber. Twice the nuchalis chased this bird, and it flew far back away from the road. I saw the nuchalis a little more, but it finally worked back out of sight, about 10:35. I stayed until 11:45 looking, but did not see it again. This slope rises above Cedar Creek, and by the creek and on the other side of it is a fine stand of green timber. I have seen one cedar in here. The timber and along the creek is full of soft deep snow, but much of this slope is free of it. It is quite steep though, with no trails, and walking is slow.

At 4:00 P.M. I went to 53 mi. SW, and walked a long way up the slope where I saw ruber on the 23rd. I stayed until 6:30, but did not hear or see a sapsucker. There is an abundance of apparently good nesting trees, but I found no nests.

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50 mi. SW of Princeton, B.C., British Columbia

May 26 - partly cloudy - 9:00 A.M. to 12:30 P.M.

I climbed up the slope where I saw sapsuckers late yesterday morning, but found none. This was discouraging for there are many apparently suitable nesting sites. On the slope above the Falls, if one spends 2 hrs. just walking or sitting at almost any time of day sapsuckers are sure to be seen or heard. Either there are none nesting on this slope or they are very quiet about it. Probably yesterday they were more active because of the many insects visible in the bright sunlight.

May 27 - I started out at 4:00 A.M. for 50 mi SW to determine just when the first tattoos begin, if there are any, but ran into so much rain that it was pointless to go on over the pass. At 4:40 I got back to the Falls; it was still dark, just getting light in the east, and I stopped at the slope here to listen. Robins were singing loudly, and a few other birds, but it began to rain here too and I gave up until later.

At 2:00 in the afternoon I went up the slope at 29 mi. SW, and met ♀ or one just like him feeding around in the live conifers just west of his nest. A few minutes later, a nuchalis appeared nearby, and ♀ flew over to her. There were squawks, and a copulation following the usual pattern. The nuchalis (n.?) perched cross-wise on a branch, and the ♀ approached

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May 27 (cont'd.) her, moving lengthwise, and fluttering his drooping wings (I noticed this before, but inexplicably failed to write it down), squawking, and with his crown feathers up. He mounted her for a few seconds - she was entirely passive, her head arched far back - and then hopped off and flew away. As I moved on, I heard two tattoos from that direction. I arrived at the r-n. nest at 2:20 P.M. The weather was still very unsettled, with occasional light rain and hail, which was annoying. An hour later, at 3:20, I heard one scream; n. flew to the nest and went directly in. A few moments later she looked out, then came out to a branch below the nest, paused, and flew away. I waited until 4:00 P.M., and though I heard a few nearby screams, neither bird came to the nest. I doubt if there are eggs yet.

May 28 - 8:40 A.M. - R. (or one like him) was down in the just-~~budding~~ leafing aspens right by the cabins, screaming and tapping around. He was about $\frac{1}{4}$ mi. from the nest, if it was the same r. At 9:00 A.M. I was at the nest. At 9:38 r. came up, hitched up and down, looked in and went in. 9:40 - n. arrived at nest, squawked, moved aside, preened and scratched. r. then squeezed out, flew off with a rattle, n. went in. N. looked out a few times, came out at 10:00, diving down and alighting crosswise,

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May 28 (cont'd.) on a branch a couple of feet below the nest. She sat there a few moments, then flew off. 10:15 - r. returns, goes to nest, seems to listen, looks in, hitches around, finally goes in. In a few minutes he looks out a few times, finally comes out, 10:30. When r. emerges, he usually does so with his head down, then pivots on one foot and comes around right side up. He flew off to some nearby trees, screamed some, returned at 10:40, hitched around but did not go in the nest, then left. At 11:00, I left; neither bird was there. During this 2 hr. period I heard various screams, yelps, and a few tattoos, but could not correlate and activities with the sounds.

I went to the nest site on the slope west of the r-n. nest slope, arriving at 11:20, and waited until 12:00, but did not see a sap-sucker. As I was returning along the lower part of the wooded ridge that separates the two slopes, I heard a scream and saw a ♀ nuchalis. She worked around a few trees, then screamed loudly several times. A ruber came up, and they approached each other, squawking. The ♀ n. then seemed to invite copulation, perching crosswise on a branch and arching her head back. The ♂ r. then approached lengthwise, fluttering his wings, his crown feathers up, and squawking. He did not mount her, however, but stopped for no

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May 28 (cont'd). apparent reason, and flew off. I was close by, but half behind a large tree, and quite motionless. The ♀ n. remained for a few moments, then flew off also. I feel sure this is the same r-n. pair as is nesting up higher on the slope, but there is no way to be absolutely certain.

I went up on the more western slope at about 4:00 P.M. Around 4:30 or 4:45 (I forgot my watch) I heard yelps, and saw a nuchalis at the nest site described several days ago. More yelps - the bird flew over to a large dead tree about 75 yds away, where another nuchalis was - squawks. One, apparently a ♂, ~~approach~~ approached the other lengthwise on a branch, squawking, fluttering his wings, bobbing slightly, crown feathers raised. The other was not receptive, and did not assume a copulatory pose. I am not even sure it was a ♀, but there was no sign of aggression. They hizzed around, and the same actions were repeated - no copulation. One flew off, the other paused, followed, the flew far off up the slope and I lost track of the other. Neither went to the nest site in the next 20 min., and I left, about 5:15 A.M.

50 mi. SW of Princeton, B.C.

May 29 - Here at 4:27 A.M. - overcast, drizzly. First tattoo, 4:52; 5:01 - repeated several times until 5:20. It was then getting really light, but

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50 mi. SW of Princeton, ft., British Columbia

May 29 (cont'd.) very fine snow or rain continued.

At 6:00, I walked around a bit on the west slope, and found a typical nuchalis feeding at a small conifer which had clearly been visited often. After a few minutes, the bird flew about 50 yds, to near the edge of the road; I heard a few screams, but could not locate it again.

By 7:10 the rain had increased somewhat, and I came back to the car. At 7:30 it was still raining steadily, and I left. A few miles east

of the pass, it was relatively clear. I heard a few yelps during a brief stop at 34 mi. SW.

8:45 - at 29 mi. SW of Princeton, B.C. - I went to the wooded ridge between the burned slopes and saw r. right away; he was feeding at a small balsam about 6 ft high, eating sap with his head turned partly sideways, the way all sapsuckers seem to do. Then there were screams and yelps from nearby; r. flew towards them.

In a minute or so n. (supposedly) flew up the ridge a little, followed by r. R. tattooed once. I lost sight of n. after the two got together for a moment, but saw r. moving up the slope in the direction of the nest, 9:00 A.M. [To Princeton for supplies]

4:30 P.M. - at r-n. nest; very windy, cloudy, occasional very light snow. At 5:20, r. came to the nest, glanced in from the side several times, hitched up, looking in other holes, finally left, 5:30 I left at 5:45; I never did see n.

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S. varius ssp.

50 mi. SW of Princeton, B.C., British Columbia

May 30 (~~May 31~~) Delayed by car trouble, I got here at 7:30 A.M. The disappearance of much of the snow has revealed a marker, M34, which means 34 miles from Hope, by road. This would make the spot a little closer to 49 mi. SW of Princeton, but by my speedometer it is 50.

I started up the east slope, heard screams, and saw a sapsucker fly up nearby. It was right in the sun and I never did get another look at it. I went all the way to very near the top of the ridge and down by a different route, but I did not see or hear a sapsucker - 10:15.

I crossed to the west side of the road. [A creek runs from the southwest into Cedar Creek at this point. On one side, the timber is almost all green, and on the other the Burn starts. The small valley in which this creek runs extends to the southwest and provides green timber for several miles, quite possibly to the other side of the Burn.

At 10:25 I saw a nuchalis in a dead tree on the green side of the creek. Then a typical ruber flew to a small balsam near me, on the Burn side. The ruber moved on up the slope a short distance, and began to feed near and even on the ground, apparently on ants, which are fairly large and abundant. The nuchalis, which I am virtually certain was a ♂ by its color,

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S. varius ssp.

50 mi. SW of Princeton, ft., British Columbia

May 30 (cont'd.) followed and alighted in a spruce at a higher level than the ruber. Then it flew to a small dead tree and tattooed several times; the ruber payed no heed. The nuchalis did some flycatching, then flew down to the ruber, "crest" up and squawking; the ruber flew off a little ways, and began feeding again. In the next 30 minutes, this was repeated several times — the nuchalis aggressive, tattooing — the ruber flying off a short distance when approached, never tattooing. The action took place over a strip of hillside about 100 yds long. The nuchalis flew over across the road to the east slope, a distance of several hundred yards, and in a few minutes was back. Another nuchalis appeared, probably the mate of the first. One nuchalis, presumably the ♂ and the same one each time, continued to harass the ruber, tattooing loudly and the flying over to it in an aggressive way, squawking and with its "crest" up. The 2nd nuchalis seemed to follow along, giving an occasional tattoo. The ruber always flew off when the nuchalis came up, but seemed determined to stay in the general area — the chase went back and forth, often involving the same trees. The ruber stayed consistently low or on the ground, but did a bit of flycatching. The nuchalis tended to stay about 20 ft up, did quite a lot of fly-

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May 30 (cont'd). -catching, but went to the ground occasionally. Finally, about 11:50, the ruber flew far up the creek, to the southwest, and the ♂ nuchalis followed. They went over the shoulder of the ridge, then came up again, and worked back towards me. Again they went off ~~to~~ to the southwest, finally across the creek to far over on the green side, where I saw the two in the very top of a dead spruce over 200 yds away. I could barely make them out. Then the ruber went farther southwest, and I lost sight of it; the nuchalis remained in the tree a few moments, then went a little to the east, and I lost sight of it too. At least $\frac{1}{4}$ mi. was involved in this activity, which lasted until 12:05.

I would guess that this is the territory of a nuchalis pair (both were typical), although it is a large one. The ruber may have wandered up from the west, but its unwillingness to leave may mean that its own territory is not far away, although far enough so that no defensive attitude was aroused.

The weather was almost completely clear.

29 mi. SW of Princeton, B.C., May 30 (cont'd)

At 3:15 I was by the r-n. nest. 4:03 - r. arrives, looks in 3 or 4 times, preens, flies off. 4:15 - n. up from 100 yds down the slope; squawks at the nest, hitches above it, flies off 30 yds up the slope, gives 3 yelps. R. comes to the nest; n. leaves; r. pauses, leaves also.

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29 mi. SW of Princeton, B.C., British Columbia

May 30 (cont'd.) - 4:56 - r to nest tree, looks in hole on east side, then to nest, looks in 4 times, goes in.
5:24 - n. flies right to nest, squawks; r. looks out, goes back in. N. hitches to one side, waits. In about a minute r squeezes out, pivots, seems to catch a claw. N. comes up, waits for him to get out of the way; he leaves, n. goes in.
5:34 - screams; n. looks out; after several attempts, n. squeezes out, drops to the branch 3 ft below the nest. 5:25 - n. leaves. I leave too. Neither bird seems to remove anything from the nest, and I presume it is finished. They don't stay in the nest enough to be incubating, I don't think, but they keep going in from time to time.
50 mi. SW of Princeton, B.C.

May 31 - ~~at~~ 7:40 A.M. - still ice, heavy frost; clear. I went along the lower part of the west slope, following the direction of the creek which runs from the southwest. Just off the road, at 7:45, I saw a nuchalis, in the area where they were yesterday morning. It tattooed several times, then flew over towards the creek. About 1/2 mile or more from the road, at 9:30, I chanced to see a sapsucker fly up into a big dead tree. It was nuchalis. After 15 min of quiet crosswise perching, it flew about 200 yds east to a very large, barkless dead tree with a number of holes in it, near the creek. I kept the glasses on it, and was barely able to see it go into a southwest facing hole about 30 ft. up.

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50 mi. SW of Princeton, ft., British Columbia

May 31 (cont'd.) I noted the spot carefully and continued west. About 200 yds further on, I heard tattooing, which was repeated a number of times. I finally located the bird, which was typical nuchalis. It continued to tattoo irregularly from this general area for the next hour and a half — 10:30 — 12:00. I happened to have a small socket wrench in my pocket, and I found that a very rough imitation of a tattoo made by tapping the wrench on a dead tree got consistent responses from the bird.

I continued on another $\frac{1}{4}$ mile and reached the end of the area from which the snow has gone. Another creek comes in from the north, and to the north and west steep, snow-covered slopes rise. Turning back, I was able to start the above-mentioned nuchalis tattooing again by imitation, but it took about 15 min before it came close enough for me to see it plainly. Then I walked within about 20 yds. of the nest described on the previous page and began to tattoo. In a few minutes a bird came from the nest tree over to within a few feet of me, obviously much agitated, its crown feathers up. I was able to keep the bird right over head by continuing to tap; finally I went a few yards off to a dead tree and began to tattoo. This was a very red nuchalis; the head stripes were distinct, but red overlapped most of the black pectoral

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50 mi. SW of Princeton, B.C., British Columbia

May 31 (cont'd.) band. It could be either a male or possibly a slightly intermediate ♀; I think it is a ♂. As I started to leave, its mate came up, and they squawked together. Then one of them went directly to the nest and in. I think incubation must be under way. The mate was typical nuchalis.

Back at the car at about 1:30, I heard yelps from close by the road on the east slope.

So far, I have found only nuchalis territories in here, although I did see a ruber yesterday. Since the tattoo imitations worked so well, even around mid-day, I will try to define the territories accurately and find out if ruber is breeding over here.

June 1 - Rain all morning. At 1:30 I was at 50 mi. SW, and tried tattoos on the east slope for 15 or 20 min. with no results. Then I went to 53 mi. SW, and tried there until 5:00 P.M., with no better luck. The weather was windy and unsettled, alternating sun and light rain.

June 2 - 52 mi. SW of Princeton, B.C.

7:45 A.M. - clear. This is a patch of green timber in the middle of the burn, but not a big patch. Mostly the trees are large and with heavy bark - not too favorable for sapsuckers. I walked around in here for about 2 hrs., imitating tattoos, but did not see or hear or see any signs of sapsuckers.

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50 mi. SW of Princeton ft., B.C.

June 2 (cont'd.) I got here a little before 10:00, and it was already hot. My tattooing on the east slope near the road got no response. I crossed to the west slope, right to a spot where I have seen sapsuckers several times. My tattoo imitations got no apparent response, but at 10:20 I heard yelps and saw two nuchalis near the road. They were a good distance away, but I saw one approach the other with wings fluttering and attempt to copulate with a crosswise-perched bird. The ♀, if it was one, was very unreceptive and would not permit the ♂ to mount. In a moment both flew across the road. As my continued tattoos were unsuccessful, I went back across the road too and although I found a nuchalis feeding there I could not get any response by tattooing. I left at 11:35.

This was discouraging, as the success of May 31 led me to think I had a sure method of locating any sapsuckers within hearing distance, but today it did not seem to work at all. I did not hear a single tattoo from any of the birds. Oddly, it seemed to excite Hammond Flycatchers more than anything else.

29 mi. SW of Princeton ft., B.C.

June 2 (cont'd.) 2:20 P.M. - at r-n. nest. R is at the nest tree, doing some flycatching nearby. 2:25 - r. to nest, in. 2:55 - n. to nest, squawks, r. out with a rattle, n. goes in. R. remains in a

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29 mi. SW of Princeton, ft., British Columbia

June 2 - (cont'd.) tree 15 yds from the nest. 3:08 - n. struggles out, drops to her usual branch 2 ft. below the nest. Both r. and n. engage in flycatching close by the nest tree, frequently going within a few inches of the nest itself. 3:20 n. finally goes back in the nest; r. drifts off, flycatching. There are many insects visible in the bright sunlight. 3:50 - n. struggles out, taking a full minute, drops to her usual branch, looks around, preens. 4:00 P.M. - n. hitches up and down the nest tree above and around the nest, flycatches. 4:30 - n. finally leaves the nest tree, out of my sight. ~~4:40~~ 4:45 - n. returns directly to the nest, then sits looking around and preening for 10 minutes. Sapsuckers must be among the preeningest of all birds. 4:55 - n. finally goes in the nest; I leave.

This behavior leaves me uncertain whether the birds have eggs or not. They are definitely not working on the nest cavity, for they do not cast out any chips. I was sure they were incubating until the nest was left empty for a full 65 minutes - 3:50 to 4:55 P.M. Of course, the sun is on the nest tree all day, although never directly in the nest, and it may get pretty hot inside. Still, I don't believe the birds count on that.

53 mi. SW of Princeton, ft., B.C.

June 3 - Clear except for slight haze, not very cold. Arrived at 6:10 A.M., stayed until 10:30 A.M.

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53 mi. SW of Princeton, ft., British Columbia

June 3 (cont'd.) I spent these hours wandering about the slopes and giving what sound to my jaded ears like reasonable imitations of a sapsucker tattooing - at least as good as the ones that got results at 50 mi. SW. Not a sapsucker was seen or heard, although I took pains to spend time in the exact spots where I saw and heard ruber here once before. ~~Oddly~~, Oddly, I got good responses from Rufous Hummers and the Empidonax flycatchers. I have noticed that hummers sometimes fly at a woodpecker while it is tapping, and they frequently came up to my imitations. I was very disappointed by this morning's failure, for I went into fairly open places with lots of dead trees and also into the heavy green, mossy live forest. Either the birds are not in here or they keep very quiet. If here, they are probably incubating and thus are not in a tattooing mood.

29 mi. SW of Princeton, ft., B.C. June 3 (cont'd.)

I walked up to a spot on the slope above the Falls where I have always seen nuchalis, and one was there this time. I waited for about 20 min. to see if the bird would go to a nest, but I didn't see it do that. It was chased several times by a Mt. Bluebird. I did quite a bit of tattoo imitating then, and although I got good responses from the bluebirds and a Western Kingbird, the sapsucker(s) took no notice at all.

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29 mi. SW of Princeton, ft., British Columbia

June 3 (cont'd.) At 4:40 I was at the r-n. nest. At 4:47 P.M., n. looked out for a while, then went back in. At 5:00, she looked out some more, then squeezed out, to the usual branch, 5:02. Then she did some flycatching, usually returning to the nest tree, until 5:20, when she flew off to the east. At 5:56, n. returned to the nest tree; I had heard screams nearby just before. She sat by the nest hole for 5 minutes, then went in at 6:01 P.M. I did not see r. at all.

It seems to be a custom for n. to leave for an hour in the late afternoon; it could not have been very hot in the nest as the sun was not out after 1:00 or a little later.

June 4 - warm, partly cloudy. 9:15 - at r-n. nest. 9:16 - n. looks out, then back in. 9:23 - n. looks out, comes out to usual branch, scratches, preens. up by nest, preens some more. 9:29 - n. goes back in the nest. 9:46 - n. comes out, stays by nest. 9:50 - n. back in. 9:57 - r. to nest directly, squawks, n. out and away; r. pauses, goes in. 10:04 - r. out to the usual branch, goes back in, 10:05. looks out, draws back in. 10:23 - n. to nest, squawks, r. to branch, n. in; r. goes to nearby tree, then off 200 yds. 10:34 - n. out, back in at 10:38. 10:52 n. looks out, comes out at 10:53, to branch. 10:56 - n. off to near where r. went; screams. 11:12 n. back to nest, in. I leave.

In the afternoon I walked west along the road to a partially burnt-over slope about

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30 mi. SW of Princeton, B.C., British Columbia

June 4 (cont'd) a mile away. Here I found another sapsucker nest, about 30 ft up in a broken-off dead conifer, about 3 ft below the top. At 3:45 a bird flew up to the nest, squawked, and one came out and alighted close by. After a pause the other went in. Both birds were typical nuchalis. I imitated tattoos for 10 min. right by the nest and got no response at all. This has been such a complete flop except for the first time that I am amazed that it worked then. However, the birds tend to be quieter and more secretive during incubation, and that may account for it.

53 mi. SW of Princeton, B.C.

June 5 - 4:40 A.M. - partly cloudy. No sapsuckers seen or heard, though I watched a likely nest site from 5:30 to 6:00 and from 7:30 to 8:00. I walked up the east slope and it is most unpromising. The trees are almost all lodge-pole pines, and I did not see any likely-looking nest sites. I left at 8:45. At 6:30 P.M. I returned and watched the likely nest site until 7:15, but saw nothing.

One of the men at the Manning Park Ranger station said he had seen a woodpecker building a nest nearby; his description fitted nuchalis - "head with black and white stripes, and red" - or at least, not ruber.

June 6 - steady rain.

June 7 - travelled north to Alexandria, B.C.

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S. varius ssp.

Alexandria, 1800 ft., 28 mi. S. of Quesnel, B.C.

June 8 - 6:15 A.M. - clear, not very cold, out in the aspen groves. At 7:15 I heard one ~~tattoo~~ that was not repeated. These groves do not look as though they have a large sapsucker population - very few workings, and those mostly years old - and even fewer trees with nesting holes, although there are many of all ages and sizes. At 9:00 A.M. I was by a small trickling stream where there were a few workings in some birches. I saw a sapsucker at fresh drillings in a small birch about four inches thick. ^[the hell it was; see account of June 14] it was a real intermediate, perhaps slightly towards nuchalis. Unfortunately a Robin suddenly drove it away out of sight. The Robin has a nest a few feet away.

In the vicinity of Quesnel and Dragon Lake, B.C. (see journal) I did not see or hear sapsuckers, but it was mid-afternoon, the worst time.

June 9/10: no sapsuckers; see journal.

Between Kersley and Alexandria, B.C. ^[= 17.5 mi. S. of Quesnel]

June 11 - my speedometer is not working, so I can't record exact mileage now. A. Robertson's Farm is at this point. Weather clear, hot, many insects on wing. At 10:40 I was passing here and saw a sapsucker fly across the road. Before I got a good look, it went back into the aspens, but another came up. It seemed to be nuchalis > ruber. It looked like a

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17.5 mi. S. of Quesnel, _____ ft., British Columbia

June 11 (cont'd.) big, dark, nuchalis, but the white post-ocular stripe was completely obscured and the black pectoral band was narrow. It too worked back (east) into the aspens out of sight. I looked around in the grove but did not see or hear them. As I returned to the road another bird came up gathering insects low and almost on the ground, like the others. This one was absolutely typical nuchalis. (Few minutes later) - I just found the nest - about 35 or 40 ft up in a big aspen, live, about 18 or 20" in diameter, facing NE. It is the only hole in the tree. I saw both the above-described birds go into it, and they are feeding young. One, the darker and in all probability the ♂, cleaned the nest. A good look at him shows a normal pectoral band, and it is quite possible that he is not an intermediate. [Collected, June 14; TRH #s 414-15]

McCleese Lake, _____ ft., 20 mi. N. of Williams Lake, B.C.

June 11 (cont'd.) - This is an attractive lake, with conifers and mature aspen and cottonwood around it. I found two nests, both in aspens, and with parents feeding young. All were typical nuchalis, as expected. One nest was only 7 or 8 ft. up in an aspen about 12 in thick, the other about 25 ft up in a slightly larger tree. I would estimate the age of the young as less than a week; the parents went in the nest to feed, and often stayed in until replaced - 10 min.

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Alexandria, 1800 ft., British Columbia

June 12 - at 8:25 A.M. I found a nest in a large (18" thick) aspen, facing south, about 13 ft up. There were several older holes in the same tree, which is a live one. I had seen fresh workings within about 50 yds in some birches, and as I scanned the surrounding trees I saw the ♀ looking out. A chickadee was scolding loudly. In about 4 min. the ♂ came up, rather nervous, perhaps as the squirrel was still sounding alarms. Both birds are nuchalis. The ♂, carrying food, was like the one seen by the road and described yesterday; the white post-ocular stripe was very obscure and the bird looked dark in general, but it is still nuchalis. He squawked, and the ♀ came out. The ♂ went in with the food, and I left.

There are a couple of small clearings by this nest, as is usually the case. I don't believe many, if any, nests will be found in the dense stands of small aspen. Sapsuckers depend too much on flycatching and ant-gathering to feed their young to stay where the trees are very close all around.

At 10:00 I went to Ronny Moffatt's ranch, about ½ mi. S. of the Alexandria railway station, where I can get accommodations. Also, I have been told by two people that there are lots of woodpeckers in the woods back of the house. In the afternoon I walked



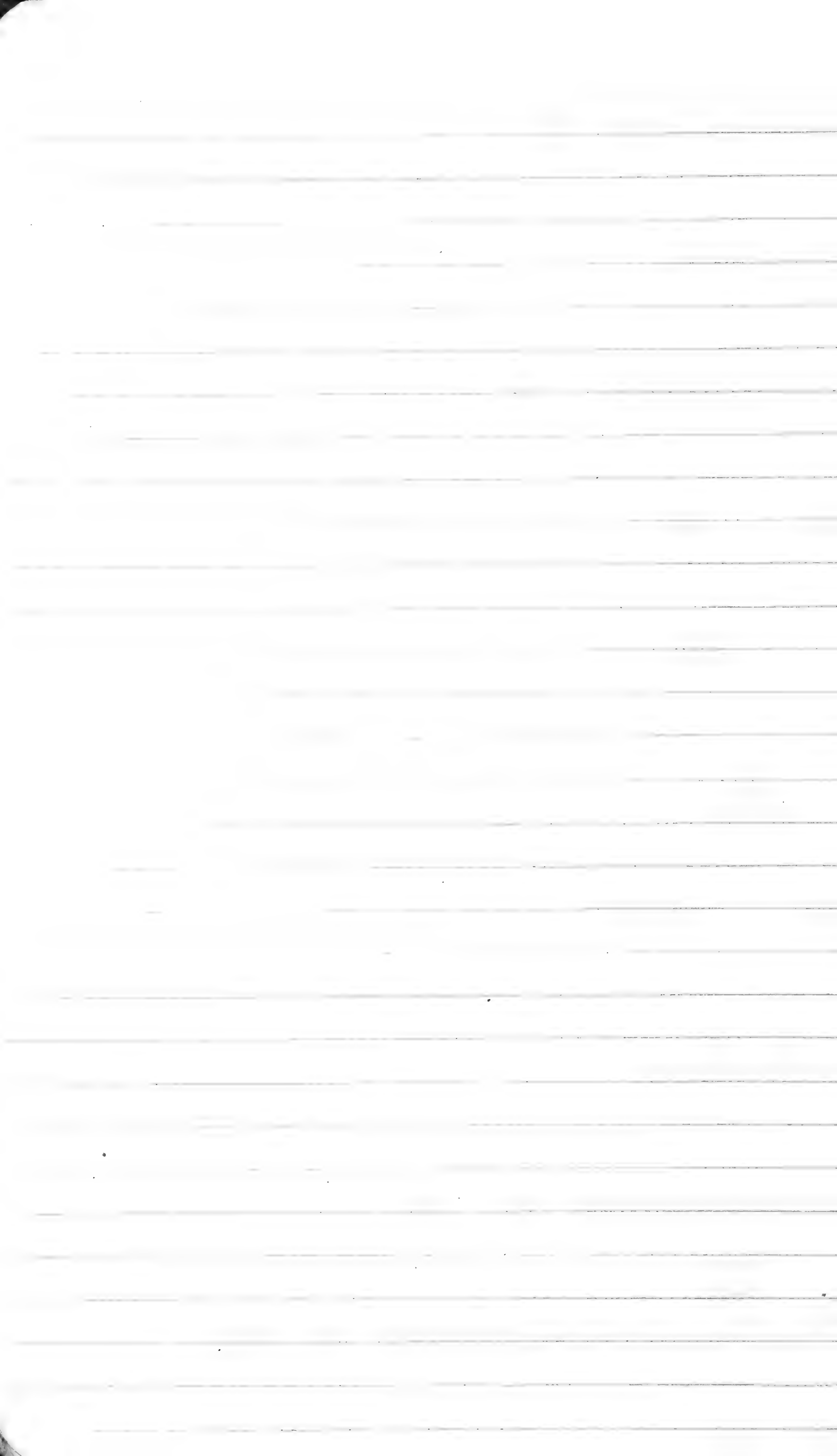
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Alexandria, 1800 ft., 28 mi. S. of Quesnel, British Columbia

June 12 (cont'd) about $1\frac{1}{2}$ - 2 miles back up a logging road. At first the road goes through mixed aspen - birch - conifers, then as it ascends, it is mostly fir. About half-way up I found numerous old and new sapsucker workings in the birches, and located what I feel sure is a nest a few yards away in ~~a~~ a big aspen, about 35 ft. up. It is a nice freshly cut hole, one of many older ones, and faces west. I waited 23 minutes (~~for~~ 3:45 - 4:07) but did not see or hear a sapsucker.

June 13 - 5:15 A.M. - light, but sun not yet up. I went walking in an aspen-birch grove 100 yds or more from the ranch house. At 6:00 I heard a scream and a tattoo, but could not find the bird. At about 6:45 I saw at very close range a typical nuchalis, probably a ♀; it was working on a small alder. At 10:00 A.M., on my way to Quesnel to get my speedometer fixed, I saw a sapsucker fly across the road. It alighted in a small lodge-pole pine and I got a good but brief look through the glasses; it was ruber, or at least very close to it. This spot is a mixture of imm. l-p. pine and aspen, mostly the former, and is 12.7 mi. S. of Quesnel - that is, between Quesnel and Kersley. On my way back to Alexandria, I stopped and collected my northernmost pair of nuchalis, at



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17.5 mi. S. of Quesnel, _____ ft., British Columbia

June 13 (cont'd.) this spot at 3:45 P.M. It was very hot, probably around 90° in the shade.

The young were very quiet until a parent came up. The σ was up first, went in, cleaned the nest to a dead aspen about 20 yds away and began screaming at me. His rectal temperature was 41.8°C . In about 6 min. the f came up to the nest and I collected her; she was 42.0°C . I hate myself for leaving the young to starve in the nest, but there is no way I could get to them as the nest is high up in a smooth, large trunk.

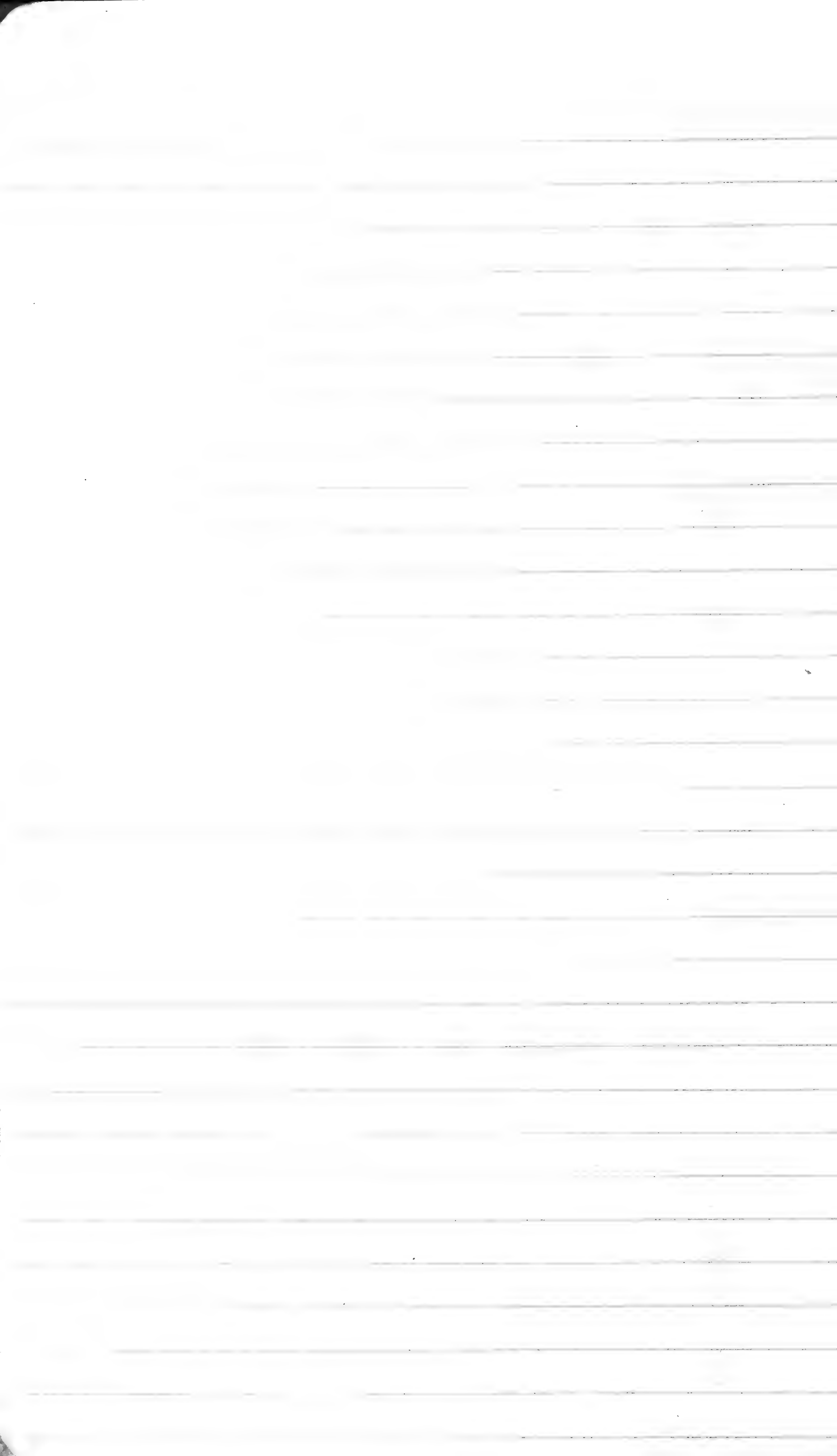
Only 5.2 miles north is where I saw ruber this morning.

Alexandria, 1800ft., 28mi. S. of Quesnel, B.C.

June 13 (cont'd.) At 5:30 P.M. I went up back of the ranch house in an aspen-birch-fir woods and found a nest about 40 ft. up, facing NW, in a mature aspen — a tall one about 14" in diameter. One parent, a f , I think, is a typical nuchalis, and the other is ruber.

Right next to the nest is a large clump of birches that are riddled with workings. Both birds made 3 or 4 visits during a 20 min. interval; the ruber cleaned the nest once.

June 14 - screams and a couple of tattoos from the aspen grove by the meadow, and again I saw typical nuchalis feeding at an alder. I visited the r-n. nest here, and saw the ruber plainly; it looks perfectly typical.



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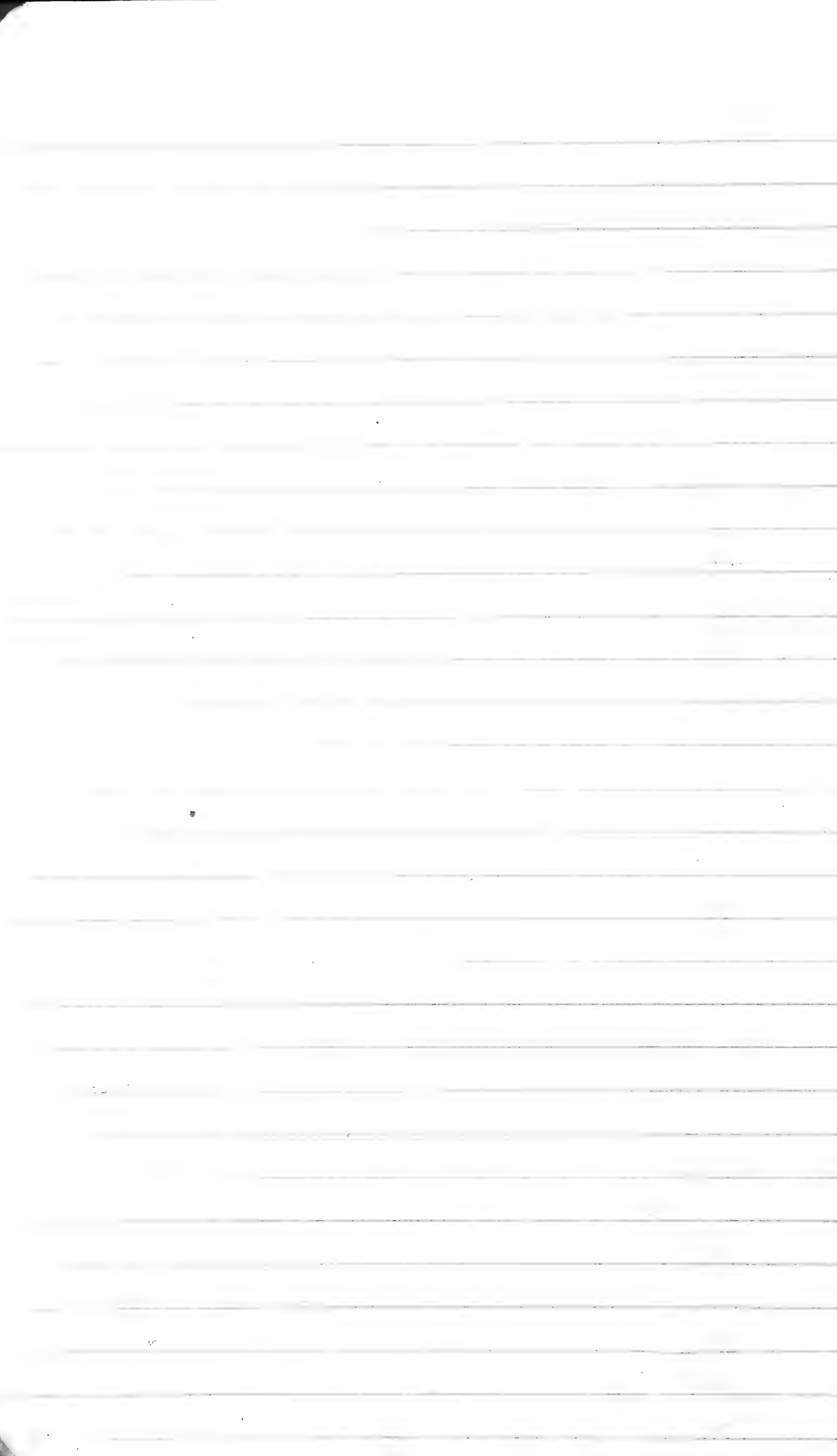
Alexandria, 1800ft, 28mi. S. of Quesnel, British Columbia

June 14 (cont'd.) At 7:00 P.M. I found a nest about 25 ft. up in an aspen about 20" thick, which had no other holes in it, facing west. It is at the northwest corner of the aspen birch grove where I saw nuchalis this morning; both parents were seen at the nest at the same time, and they are typical nuchalis. Both came bringing insects in their beaks, and went in at each visit.

The birds seem to depend on birches a great deal for feeding, but so far I have not seen a nest in one. The usual location seems to be in a mature aspen not far from a clearing of some sort (for flycatching?) and with well-worked birches and/or alders near by. This nest is at the edge of a large, marshy field.

The ♂ nuchalis I collected yesterday has no white post-ocular stripe — just solid black. This seems to be the case with the ♂ at the nest of June 12; it is why I thought the birds were intermediates when first seen.

June 15 - clear, warm. I went to a large birch with extensive workings which had attracted a swarm of hornets, butterflies, and other insects. I saw a nuchalis, possibly the same one, visit the tree twice during the morning. It came up, promptly chased the hornets away, and began to feed at the sap wells at the top of the working, hitching round and around



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Alexandria, 1800ft, 28 mi. S. of Quesnel, British Columbia

June 15 (cont'd.) the tree. I was not successful in following it to its nest, although on the first visit it had gathered a beakful of insects and was clearly on its way to feed young.

At 4:00 P.M. I went to the nest described on June 12 and collected the parents as they came up to it. I fired a couple of heavy loads into the tree about a foot below the nest opening; I hope this killed the young instantly.

June 16 - I went about 3 miles back of the ranch house, and probably up a total of 200 ft in a long, slight rise. First the trail passes through aspen-birch, then cut-over fir, then a narrow belt of mature fir, then lodge-pole pine and immature fir, with scattered patches of aspen, all small. I spent most of my time in the upper part of the trail, but did not find sapsuckers. I saw one or two old nest holes in mature aspens, and some old workings in a birch. I hoped to find ruber in the mature fir - through which mature aspen is scattered - but didn't. I think the absence of hemlock and virtual absence of balsam makes it rather unsuitable.

At 4:15 P.M. I was looking around a large grove of mature aspen where I had not been before, and found a single typical nuchalis, apparently a ♂. I will come back and hunt for the nest.

Between 8:00 and 9:00 P.M. I heard screams and saw at least 2 sapsuckers, one definitely nuchalis.

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Alexandria, 1800 ft., 28 mi. S. of Quesnel, British Columbia

June 17 - At the north edge of the "town", there was an extensively-worked birch clump that was visited several times by at least one sapsucker, a typical nuchalis. I heard another screaming not far away. The bird went 200 yds non-stop on a couple of its flights away from the feeding tree - 8:30 A.M.

McLeese Lake, 1800 ft., 20 mi N. of Williams Lake, B.C.

June 18 - As I had not had a good look at the ♂ of the pair described on June 11 with the nest 25 ft up in a mature aspen, I went down again today with the Moffatts. This time I got long, close looks in good light, and he looks like this: head and breast mostly red, with some black on the anterior part of the auricular patch, and a white post-ocular spot; only a slight hint of a black pectoral band; some black-and-white in the post-nape part of the head. This bird must surely be ruber nuchalis. The ♀ is typical nuchalis. I saw him several times at the limit of close focus of my 10x50 binocular, and also that close while he gathered insects hopping around and hanging upside-down in warbler-fashion in a small aspen. Once or twice he cleaned the nest; I didn't see the ♀ do this. She was more nervous than he when I was close. Both parents went in to feed but usually stayed only a moment or so; the young were noisy as they entered. A Tree Swallow nest is in the next tree, 10 ft. away.

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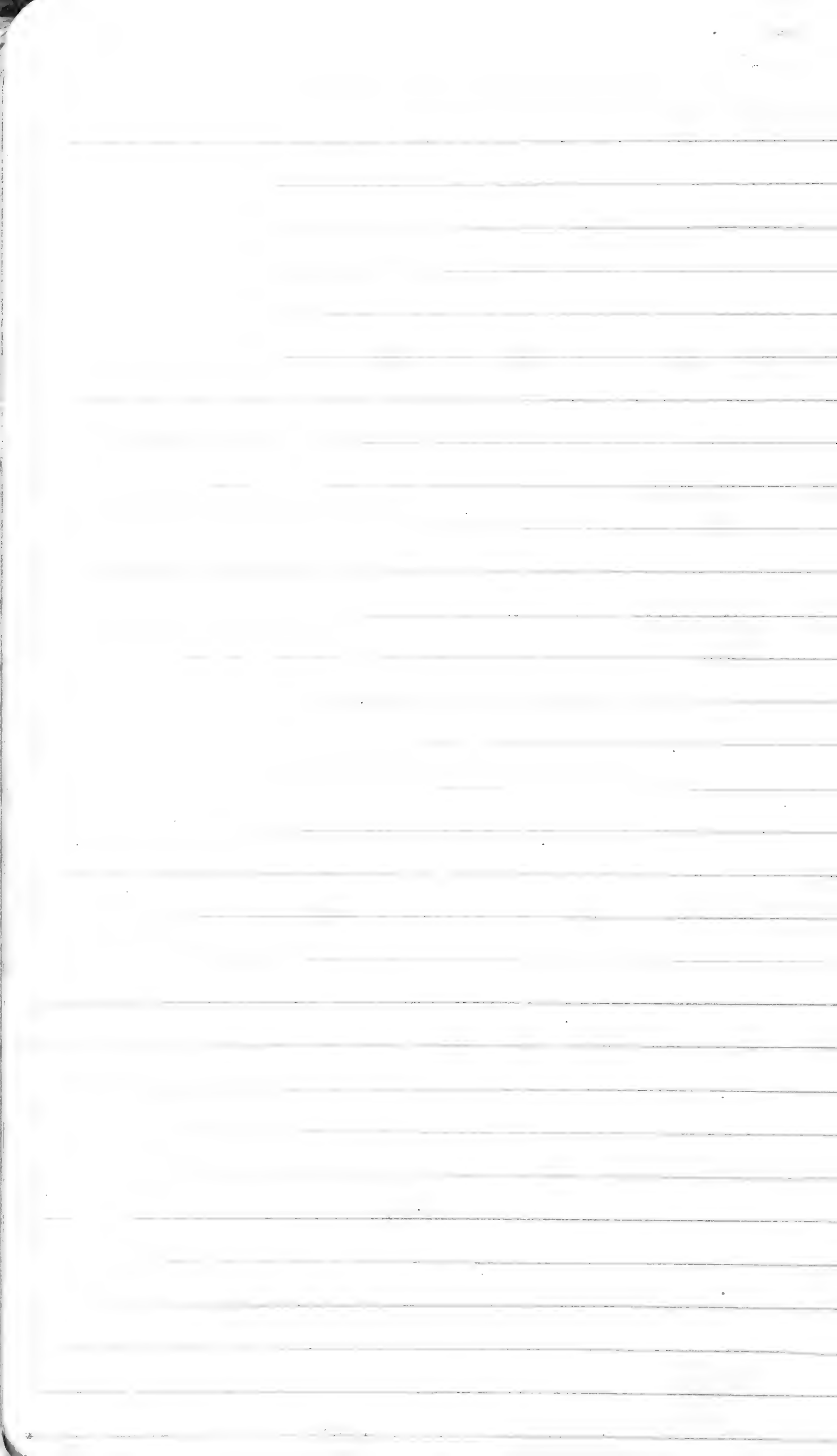
~~Form~~ S. varius ssp.

Alexandria, 1800ft, 28 mi. S. of Quesnel, British Columbia

June 18 (cont'd.). The distribution of Ruber-like birds is a bit confusing, as is the extreme scarcity of good intermediates. A possible explanation of the latter may be that if the intermediates are migratory like nuchalis, they will breed mainly with that ssp.; if non-migratory, they will breed primarily with ruber. In either case, the intermediate characters would tend to be swamped by those of the typical race.

There is some cedar along the Quesnel River, and although ruber does not depend on it, it may be an indicator of conditions favorable to ruber. As the Quesnel River extends to the north and east of this locality, it may be that some ruber work along its valley to points southeast of the normal range.

At 8:00 P.M. I went to the spot at the ranch where I saw and heard nuchalis on the evening of June 16. I saw two, but got only a good look at only one for certain; it was typical nuchalis. It was up in the dead top of a 100-ft fir, screaming frequently and occasionally flycatching. A ♀ Flicker alighted about 2 ft away and preened, but neither paid much attention to the other. As this was going on, another sapsucker flew overhead from nearby, but I could not be sure it was nuchalis. I saw one (same one?) fly into the same general area of the woods after gathering food, but I was once again unable to find the nest. The flights are over 100 yds.



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S. varius ssp.

Kersley, ft., 14.8 mi. S. of Quesnel, British Columbia

June 19 - I stopped at the Kersley store at about 8:45 A.M., and walked about for a mile or so to the west and south, but did not find a sapsucker; I saw only old workings and a few old nests, even though there were some likely spots. Then, as I came up back of the store at 10:50, I saw a typical ruber working in a birch tree. It stopped and preened, ~~and~~ and I observed it very closely with 10x50 binocs. It was absolutely typical ruber in every respect. From the birch it move to some small fir logs on the ground, and at 11:15 it flew to a fence post and then into the trees out of sight. I did not find the nest. This locality is only 2.7 mi. N. of where I collected a pair of typical nuchalis, at 17.5 mi S. of Quesnel. There is no perceptible change in the character of the countryside between the two points.

Alexandria, 1800ft., 28 mi. S. of Quesnel, B.C.

June 19 (cont'd.). At 2:45 in the afternoon I found another nest by going up the trail back of the ranch. I found this one as I heard young birds chattering nearby; it was about 50 ft up in a mature aspen, facing west, and with several other holes around it. Both parents seemed to be typical nuchalis, at least one is, and they seem to be in worn plumage. They made about 5 visits in 20 minutes. This is on the edge of a boggy spot swarming with mosquitoes



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S. varius ssp.

Alexandria, 1800ft, 28 mi. S. of Quesnel, British Columbia

June 19 (cont'd.) and flies. Also, a small Black Bear, probably a yearling, strolled up about 40 yds away. He ambled off when I shouted at him.

I stopped at the mixed nest and watch two visits each of the parents. As with the previously described nest, the parents went in and came right out.

16 mi. S. of Quesnel, ft. British Columbia

June 20 - I walked back west about half a mile from the highway on a logging road at about 4:00 P.M. The trees were mostly conifers, but with a liberal sprinkling of birch and aspen. Near the end of the road, in a mature aspen about 45 or 50ft up and facing north, was a sapsucker nest. Nearby were several well-worked birches, and there were several other holes in the nest tree. I saw both parents at the same time — one is nuchalis with possibly a bit of ruber in its ancestry, and the other seems to be nuchalis > ruber. It shows head stripes but washed with red, and the black pectoral band is practically obliterated. One bird cleaned the nest while I watched. A big rainstorm was coming up fast, and I left after 15 minutes.

During the morning I looked for sapsuckers in several likely spots around Kersley, about 15 mi. S. of Quesnel, but didn't find any.

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S. varius ssp.

Alexandria, 1800 ft., 28 mi. S. of Quesnel, British Columbia

June 21 - This morning I saw at least 2 sapsuckers, both nuchalis; one was tattooing at around 10:45 and 11:00 A.M., and fluttering around squawking.— for no apparent reason. I feel fairly sure there are no more ruber or intermediates around here.

June 22 - Steady rain since dawn. Tomorrow I think I will go up to the Prince George region for a week and return here in time to see the young out of the nest.

~~For~~ June 23 arrived in Prince George; no sapsuckers seen en route.

Nukko Lake, ft., mi. NW of Prince George, B.C.

June 24 - I came out here at mid-morning, clear, warm day, with Mr. Smith of the Game Commission here. Yesterday Inspector Gill had identified the Peterson plate of nuchalis as the bird he saw yesterday by the fish trap at the lake, emphasizing "stripes on the head" and saying that it looked worn. However, at the exact same spot I found a nest of typical ruber, about 45 ft up in one of the fairly numerous mature aspens in a forest predominated by spruce. There are also a few birches, with sapsucker workings; ditto for alders. The nest faced approximately east, and was the only hole in the tree. The young chattered and cheeped, and the parents went in the nest each time to feed them, coming right back out. I collected both parents.

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S. varius ssp.

Prince George to 25 mi. N. of Summit Lake, British Columbia

June 25 - No sapsuckers seen; see Journal for description of countryside.

Summit Lake, ft., B.C.

June 26 - after much walking around I saw one sapsucker, a typical ruber. It was gathering what appeared to be ants in a pile of logs on the ground, and in a moment flew far into the woods out of sight. I searched in the direction it went, but could not find the bird again or a nest.

Several of the birches around the lake have fresh-looking workings.

Summit Lake to 37 mi. N., B.C.

June 27 - no sapsuckers seen - see Journal
16 mi. S. of Quesnel, ft., B.C.

June 28 - I walked west here as far as the cliffs, above the Fraser River, which must be about a mile or more from the road. I found another nest here - about 40 ft up in a mature aspen, facing west; lots of other holes in the tree, including one made by a Pileated Woodpecker. I was attracted to it by the loud cheeping of the young. The locale is the type that seems most favorable - a clump of mature aspen in a rather open spot, with spruce and birch close by. Dense stands of pure aspen do not seem to be favored.

One parent is typical nuchalis, and the other looks like nuchalis > ruber; lots of red on the face. When I collect them I can be sure.

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S. varius ssp.

16mi. S. of Quesnel, B.C., British Columbia

June 28 (cont'd.) I visited the nest described on June 20 also, and it is progressing normally. At neither nest did the parents go in to feed the young; they merely poked their heads in. I estimate that these young will be out of the nest in another 7 days.

At 12:45, by the road, I heard several tattoos and loud squawks, but was unable to locate the bird.

June 29 - looking for new nests, I was unsuccessful; no sapsuckers seen or heard.

14.7mi. S. of Quesnel, B.C.

June 30 - this area is in the town of Kersley. After a long walk I found a sapsucker nest in a grove of mature aspen by a clearing. It was about 25 ft up, facing west, the only hole in the aspen. I was attracted to it by the loud cheeping of young. Both parents were typical nuchalis, and I collected them. This surprised me, as I had seen typical ruber .1 mile south of here and also less ~~than~~ than 3 miles north. (just 2mi. N.)

14.5mi. S. of Quesnel, B.C.

July 1 - I drove and walked around many likely-looking sapsucker places, but did not find a one. It was very discouraging. At 10mi. S. of Quesnel I stopped at a grove predominantly of mature aspen, and quickly found a ruber nest, about 40 ft. up, facing south, in a mature aspen. I first saw one of the parents in some aspens

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S. varius ssp.

10.0 mi. S. of Quesnel, ft., British Columbia

July 1 (cont'd.), going from one to the other gathering insects. Then the bird flew directly to the nest, about 50 yds away. Both parents appeared to be typical ruber; the young were cheeping loudly but not with their heads out. The parents did not go in the nest to feed them. I intended to collect only one, but the first one I shot proved so tough that I had to shoot it a second time, and it fell from high up, then set its wings and glided out of sight into very thick brush. I couldn't find it, and I had to collect the other, which also took two shots to finish. This is 4.7 miles north of where I collected a pair of typical nuchalis yesterday, which is pretty close.

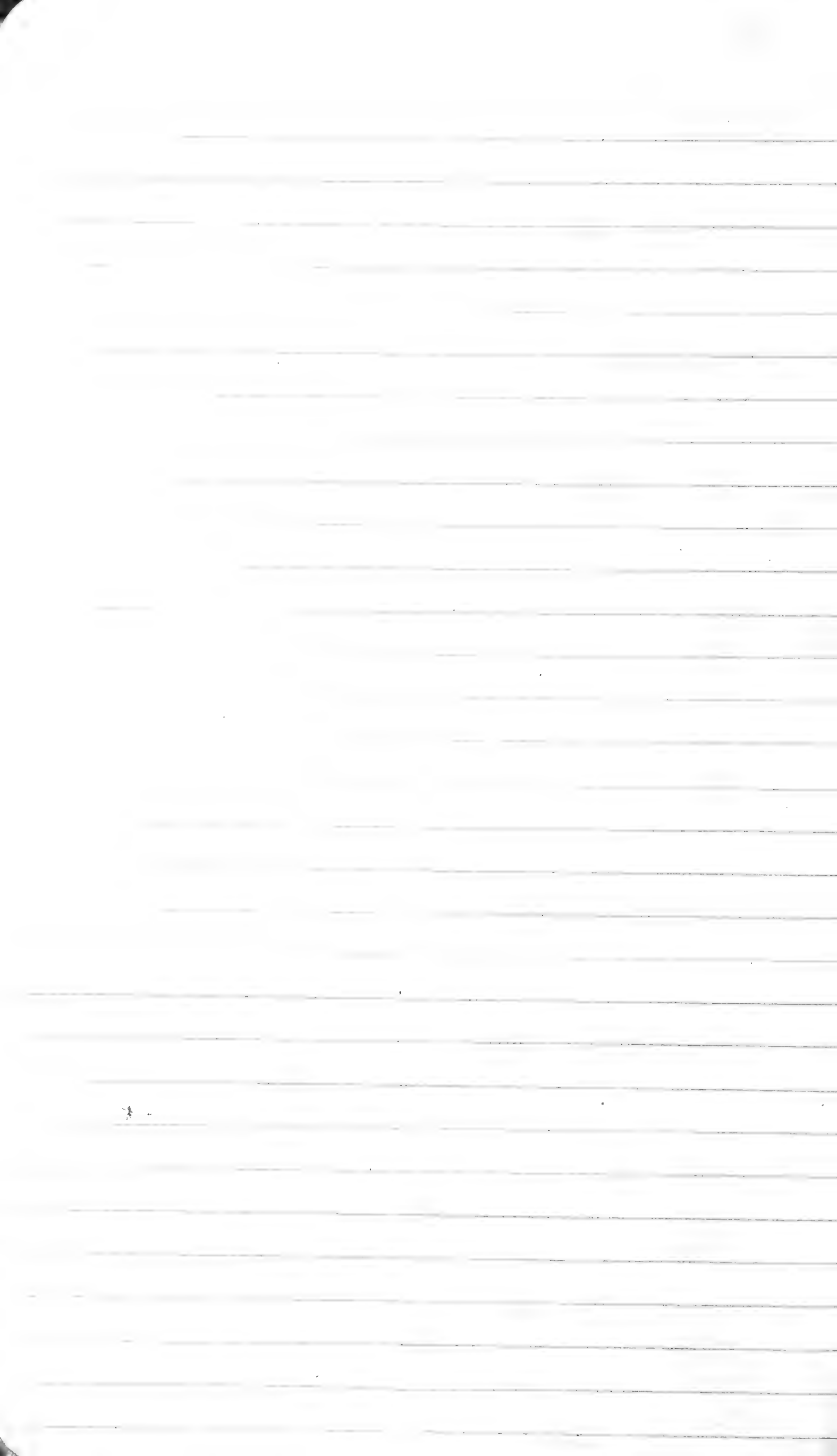
July 2 - No sapsuckers seen, looked for at two places south of Quesnel. See Journal.

14.5 mi. S of Quesnel, ft., B.C.

July 3 - Considerable searching revealed only a lot of workings in birches and a fresh-looking but empty nest in an aspen. Bah.

Alexandria, 1800ft, 28 mi. S. of Quesnel, B.C.

July 4 - I went to the ruber-nuchalis nest here, and all was quiet. Soon the parents came up screaming, but the young were evidently out. I had very bad luck in trying to collect the parents - I wounded them both at close range, and they both got away into the bush. All efforts to locate them failed. I finally managed



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S. varius ssp.

Alexandria, 1800ft, 28mi. S. of Quesnel, British Columbia

July 4 (cont'd.) to get two of the young, and saw at least one other. They were about 50 yds from the nest, in a clump of birches and firs. I am disgusted at not getting the parents, but it can't be helped. The young are TRH #~~5~~ 444-5; one is like ruber, the other like nuchalis. At 4:30-5:30 P.M. - I went to the

same spot. I heard and saw one young one high in a fir, and heard quite a few tattoos. I think the latter must have been by an adult, but I didn't see the bird.

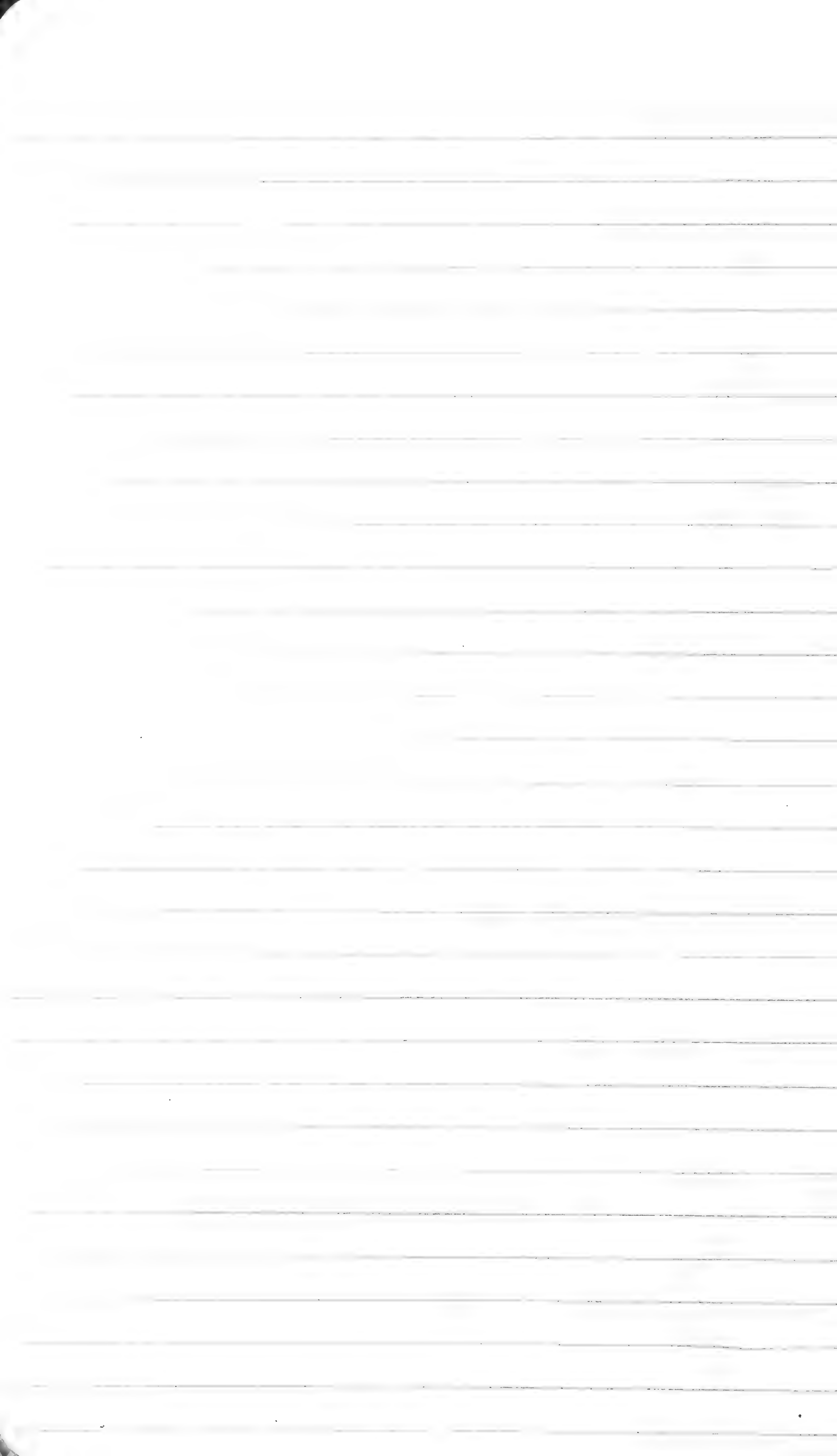
McLeese Lake ft, 20mi. N. of Williams Lake, B.C.

July 4 (cont'd.) - I went to the nest here which involves a ruber? > nuchalis and a nuchalis. The n. made 5 trips to feed the loud-cheeping young (heads out slightly), then the ♂ came up and I collected him (TRH #446). Unfortunately, I got him in the head and neck, and some of his post-ocular feathers were lost. Still, I think he has nuchalis in his ancestry. I intend to get the ♀ and some of the young when they come out, which shouldn't be long.

There were still young in the other nest, typical nuchalis.

Alexandria, 1800ft, 28mi. S. of Quesnel, B.C.

July 5 - I went back to the r-n. nest site and began tattoo imitations - it got results, and I soon got both parents and a juvenile to come up and start tattooing and screaming. I collected the ruber, which was the male.



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S. varius ssp.

Alexandria, 1800ft, 28 mi. S. of Quesnel, British Columbia

July 5 (cont'd.) The other two scattered, and I couldn't call them up then. I went back about 1½ hrs. later and got responses to tattoos. I saw the ♀ nuchalis, lost sight of her for a moment, then shot what I am fairly sure is the same bird and not a juvenal, as it was only a few feet away. However, the bird hung in a crotch of a branch, and is still there at the moment. All efforts to dislodge it failed, and I am going back now to cut the tree down. [Later] To my surprise, this adult nuchalis turns out to be a male. Its left testis was slightly larger than the right, but it is definitely not a double ovary.

There is now no use in trying further collecting of young or adults by this nest, as there can be no certainty whether the bird collected belongs to it or not. Anyway, I got the ruber, which is the important one — there are plenty of typical nuchalis around.

In the afternoon I went to the nuchalis nest below the ranch house. Both parents came to feed, and the young were cheeping loudly and clapping their beaks, but with heads in. The ♀ screamed at me several times.

16 mi. S. of Quesnel, ft., B.C.

July 6 - I went back to check on the two nests at this spot, and to my surprise they were both empty. At one, a tattoo brought an adult instantly to the nest; I shot at



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S. varius ssp.

16 mi. S. of Quesnel, ft., British Columbia

July 6 (cont'd.) it, but it flew away strongly. I heard a few screams from that direction. More ~~tattoo~~ imitations failed to get a response. At the other nest, no trace of adults or young was found. This is very discouraging; I was sure these nests would not be out so soon. Tomorrow morning I will try again.

Now for some general notes: the parents seem to be attracted back to the nest site a short time after the young have left, but once shot at, they become very wary. This is in contrast to their behavior when the young are still in, for they are very bold and persistent then. When shot at or even wounded, the adults will return or never even go away.

Alexandria, 1800 ft., 28 mi. S. of Quesnel, B.C.

July 6 (cont'd.) - A late afternoon (7:00 P.M.) visit to the ruber-nuchalis nest site did not reveal any adults or young, although ~~tattoo~~ and scream imitations were tried repeatedly.

There are still young in the nuchalis nest below the house, and both parents in attendance.

16 mi. S. of Quesnel, ft., B.C.

July 7 - I went to the nest first described on June 20, and began ~~tattoo~~ imitations, 7:45 A.M. Almost at once a bird flew up and began to answer. After a few exchanges, it flew right up to the nest hole and

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S. varius ssp.

16 mi. S. of Quesnel, ft., British Columbia

July 7 (cont'd.) looked in; I collected it then. It is almost perfectly intermediate between nuchalis and ruber. About 50 yds away I saw a juvenal, probably from this nest, but there is no way now to be sure. In any case, it is certain that this intermediate was quite fertile as it had a whole nest full of young which evidently came to maturity and cleared out. To my surprise, this bird was a ♀.

Then I went to the other nest and did some more tattoo imitations, getting responses from at least two birds, but could not get one up to the nest. Within 50 yds of it, however, I found a birch "feeding tree" in use by 3 juvenals, all with some head striping, and saw a [♀] ad. nuchalis come up and feed them, then start feeding itself. This bird did quite a bit of screaming, but apparently no tattooing. Finally I stalked a bird which was responding well to my imitations, and it was about 100 yds. from the nest. Thus, I am not sure what territory it ~~was~~ kept. The bird was very close to typical ruber, and may have been so. I took careful aim and fired, and it flew away. I cannot understand why, when I had previously collected 5 pairs with casual ease, I should now find myself lucky to get half the birds I shoot at. Such is malevolent fate.

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S. varius ssp.

McLeese Lake ft. 20mi. N. of Williams Lake, British Columbia

July 7 (cont'd.) The young were still in the nest here, but surely about to leave as they were poking their heads out and giving screams as well as cheeps. I collected the ♀ (nuchalis) as she came up to feed the young, and then cut down the tree and got the juvenals out of the nest. These are TRH #'s 450-454, and the ♂ parent #446. One juvenal may have already come out or got away somehow, as I heard cries that sounded like one, but didn't see it. The young birds all had hyoboscid (sp?) flies on them—the first time I have noticed these on sapsuckers.

16mi. S. of Quesnel ft., B.C.

July 8 - I went to the nest where I collected an intermediate yesterday and imitated tattoos. There were a few yelps, and another intermediate flew from over 50 yds away directly to a dead branch close to the old nest, and on the same tree; ~~the~~ the bird began to tattoo, and I collected it. This bird was a ♂, undoubtedly the mate of the ♀ collected at the same nest.

Then I went to the other nest I had located in this area and did more tattooing, but got only distant responses. 2 juvenals were at the same birch tree as yesterday, and soon a typical nuchalis came up to the tree and fed with them. They flew off to another tree, and the adult then went over and fed both. After a while it noticed me, flew to a dead stub, tattooed once, and then flew away and screamed quite a bit.

I walked back toward the other nest, and stopped about half way when [a loud tattoo came from



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S. varius ssp.

16 mi. S. of Quesnel, B.C., British Columbia

July 8 (cont'd.) the top of a tall dead tree right overhead. The sky was overcast with haze, and I couldn't see very well as far as colors go. There were more tattoos, and I noticed a group of at least 3 juvenals lower down, all of which looked like nuchalis. An adult nuchalis came up and chased a juvenal, and a large juvenal seemed to do some chasing itself. Then, suddenly it seemed, there was a wave of sapsuckers involving at least 5 juvenals and 4 adults — possibly two family groups. The adults worked very high, going from dead-tree-top to dead-tree-top, tattooing and screaming, and squawking when two ^{or more} got together. Once 4 adults were at the top of the same dead tree. I was sure I saw one ruber, possibly more, and am positive of 3 nuchalis. The juvenals all ~~had~~ had at least some head-stripping. Suddenly the birds stopped tattooing and dispersed, and all was quiet. I walked from this spot back towards the main road, and saw a ruber. Soon I heard the cheeping of young coming from a big mature aspen. The nest was about 25-30 ft up and faced west. I shot one parent^(♀), which clung, although dead, to a branch. The other came up right away, greatly agitated, and screamed and flew and hatched around its mate. This was a pathetic sight and made me feel more fiendish than ever, but I shot the mate^(♂) too. I had to shoot the branch off to get the other one.

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1950

S. varius ssp.

16 mi. S. of Quesnel, B.C., British Columbia

July 8 (cont'd.) The young of this pair of ruber were cheeping loudly but not putting their heads out or screaming, and I think they would stay in the nest a minimum of two more days. Thus, the ruber pairs are not necessarily ahead of the nuchalis, but may even be a bit behind.

Those birds with young several days out of the nest are starting to show pinfeathers on their brood patches.

In this area, then, are found unmixed pairs of typical ruber and typical nuchalis, and a few intermediates that are fully fertile. Interbreeding thus seems very limited, for one would expect a mixed population of mostly intermediates. The pair of ruber with young still in the nest shows that they, the residents, do not necessarily nest earlier than the migrant nuchalis. Mixed matings seem to occur chiefly when one ssp. has wandered a bit beyond its normal range, as the ruber at Alexandria and McLeese Lake. It is perhaps significant that in the mixed pairs and also the intermediates, the ♂ is either ruber or closer to it than the ♀; this suggests that redness may be selected for by the ♀s, or lack of it by the ♂s. I have not found any pairs of ♂ nuchalis and ♀ ruber.

Alexandria, 1800ft, 28 mi. S. of Quesnel, B.C.

July 9 - At the nuchalis nest in the woodlot below the ranch house, there was still at least one young one in the nest, although it was perfectly quiet

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S. varius ssp.

Alexandria, 1800ft., 28mi. S. of Quesnel, British Columbia

July 9 (cont'd.) until the ♀ came and poked its head in the nest. The ♀ had screamed at me a lot before going to the nest, but the young one(s) did not make a sound. I saw a juvenal at the small alder in the same woodlot where I have often seen adults; probably this is one from the same nest.

29mi. SW of Princeton, B.C.

July 11 - I went up to the r-n nest here, and found it silent, with neither parents nor young nearby. I heard a scream and two yelps from the ridge to the west.

By my cabin at the Falls, there was a typical nuchalis working about in the fir trees.

July 12 - An exhaustive search, with frequent tattoo imitations, failed to turn up the birds. At the lower part of the slope, where I had often seen ^{the} ruber and nuchalis feeding, a tattoo brought a yelp from a nuchalis, which is quite possibly n. of the pair. I did not see any young, or r., although I "tattooed" long and loud at the nest site.

On another part of the slope I saw a pair of nuchalis and at least one juvenal, so it seems that it is a normal time for young to be out of the nest. The ♀ of this pair is one described about a month ago, with much white on the throat.

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1950

S. varius ssp.

50 mi. SW of Princeton, ft., British Columbia

July 12 (cont'd.) where all had been snowdrifts when I left, it is now thick brush and herbs. In a few ~~2~~ minutes, however, I found a typical nuchalis nest here which is surely the one I hunted for so hard before. It is in a big, gray, barkless dead conifer, about 35 ft up, facing approximately east. Both parents were seen together, and one cleaned the nest. They go halfway in to feed the young, but it may be that nests in tough wood are deeper horizontally. A roaring stream prevented me from hearing any noise the young may have been making. Across the Burn, at

53 mi. SW of Princeton, ft., B.C., I saw a typical ruber right where I saw one tattooing over a month ago. It flew about gathering insects and then made a direct flight into some nearby timber, but I could not find the nest or the bird again. There is a roaring stream here too, which prevents location of nests by ear. There cannot be much gene flow if typical and different nesters are found on opposite sides of a 3 mile gap.

29 mi. SW of Princeton, ft., B.C.

July 13 - I was by the r-n nest site before the sun was over the ridges, which was about 5:15 A.M. All my tattooing and squeaking, here and in adjacent areas, got no response at all except one very distant scream. After two

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S. varius ssp.

29 mi. SW of Princeton, ft., British Columbia

July 13 (cont'd.) hours of searching in all the places where I had seen the birds away from the nest, I gave up. Either they did not nest in that particular spot or one very close by, or they finished several days ago and scattered far off. It was after June 2 before the birds started to act as though they were incubating, and even then they left the nest empty for intervals up to over an hour. Even if incubation started on June 2, it would be 14 days later, June 16, before the eggs all hatched, and 24 days later, July 10, before the young could be expected out. Since I got here on July 11, I would surely have seen parents and young close by. Of course, they might have actually had eggs earlier than I thought, or clipped a couple of days off the schedule somewhere, but in view of the fact that young are still in at 50 mi SW and adults and young nuchalis were seen close by their nest site right here, it is just as possible that the nesting didn't take place. Anyway, there is no way of telling now; if I found a ruber, it might or might not be the same one, and of course it is impossible to be sure of the original n.

Howell, T.R.
1949

Notes on B.C. Sapsuckers from I. McT. Cowen
now in MVZ.

2 s.v. ruber, ♂ and ♀, typical, June 23, 1949
15 mi. N. of Prince George.

1 ♂ juv. or imm. - seems to be nuchalis - white
markings on head, light grey throat, no red at all;
Aug 6, '49.

1 ♂ Jan 22, '49; Vancouver, B.C. Typical ruber.

♂, July 27, '49 Pass Lake, Kamloops; typical nuchalis;
breeding ad.

♀, July 30, '49 - same applies.

♀ July 21, '49 - Watson Lake. Typical ad. nuchalis.

♀ July 5, '49 - 149 mi. Lake. " " " ,
with white spotting on outermost rectrices.

♂ ad July 5, '49 - 149 mi. Lake - typical nuchalis.

2 ♂ juv. Aug 18, 19, '49; Sirdan Lake, Creston
~~lake~~ both typical nuchalis, bright red pin-
feathers on throat, red on crown.

This is a bit unusual. I recall seeing specimens
of migrants or winter birds still in the
"non-red" plumage, at least in v. varius.

Hurley birds

MVZ # 117606 n. slightly > r.

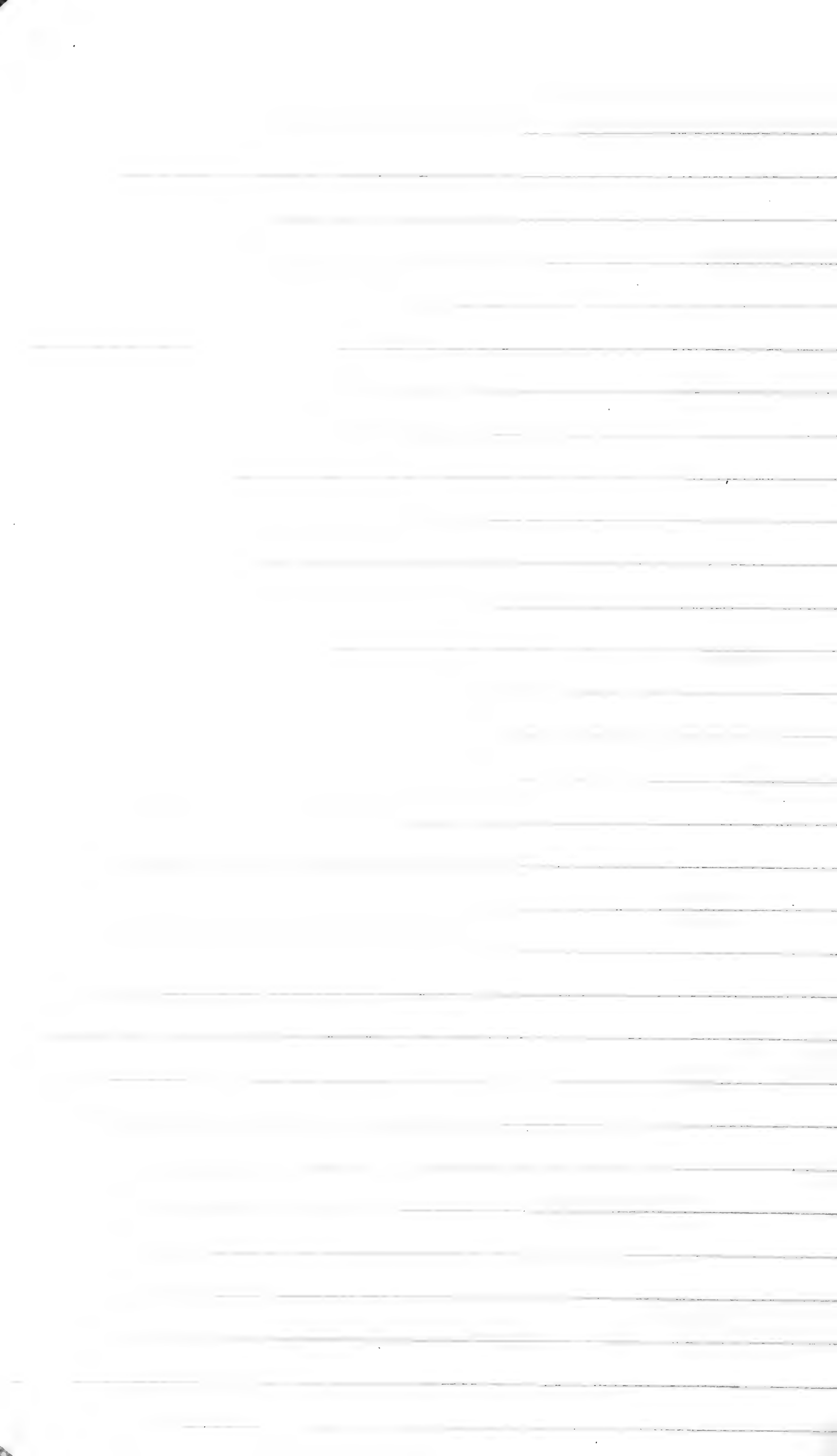
" # 117607 r. " " n.

May 16, 1944
Cabin Creek,
Antelope, Yukon Co.

" May 17

116134-7 all ruber - May 20, 1944. W. of Yukon.

1944 May 16; '45, May 22; '46 1, May 23, 1946.



Madoc Co.

12 mi. E of Frank Weston, 5500 ft. Madoc Co.

n. : AGE #s. 113, '71, '72, '81, '82

d. : AGE #s. '65, '66, '67, '71, '72, '79, '81

d slightly > n. '72, '80

d > n. '65, '72

8 mi. N. + 15 mi. W. Lundy, 4000 ft.

d. #s. '55, '56, '57

*55 related to '34, intermediate between
d and n, n ♀

nest #6 Boulder Flat.

♂ #103 (198) d slightly > n n is older
♀ #102 d > n

nest #2 ♀ imm.
♂ d > n ♂ is older

nest #3 ♂ d. ♀ is older.
♀ d slightly > n.

nest #7 2 juv. ♂ & ♀ d. some inter-
100 " is n. mediate



MVZ # 31469 Intermediate form
3 mi. NE Hampton 2100 ft. July 14.
alt. 5, 1942 A. G. A.

MVZ # 34432 Common, above 4000 ft.
intermediate between 1 and 2. Same.

Western Birds

83313 - 1 n > d. 2 mi NW. J. Hill. Salt
Oreider Co. June 15.

83412 - 2 ~~dr~~ r - lightly > n. 4 mi. NW. J. Hill.
1 mi W. J. Hill. 2 mi NW. J. Hill. June 15.

From same locality, 1 typical n. and 1
typical r. (1 > d.?)

From N. J. Hill. 100 ft. 100 ft. 100 ft.
5 suber. (> d.?)

1 mi. E. J. Hill. 100 ft. 100 ft. 100 ft.
2 r > d?

Lake Co., J. Hill. 100 ft. 100 ft. 100 ft.

4 typical n.

✓ Creek Co., J. Hill. 100 ft. 100 ft. 100 ft.

✓ Grant Co., 1 typical n.

Santa Domingo, Bay L. 20. 4, '85. 100 ft. 100 ft.
Oct. 12, 100 ft. 100 ft. 100 ft.
Vally Trinidad Nov. 12.

